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DISEASES CAUSED BY BACTERIA AND FUNGI

Mann, P. H. (1960). **Bacteriophage typing of staphylococci from animals.** — Canad. J. publ. Hlth 51, 153-156. 3454

228 coagulase-positive strains from cattle, sheep, horses, pigs, dogs, cats and poultry were classified with the aid of 24 phages. The results are presented in table form.—R.M.

Smith, F. F., McKay, K. G., Noorlander, D. O. & Gray, D. M. (1960). **The California mastitis testing program in Shasta county.** — Proc. 63rd Meet. U.S. Livestock Sanit. Ass. San Francisco, 1959. pp. 171-179. 3455

A major obstacle to mastitis control is the availability of antibiotics to cattle owners and the hope is expressed that restrictive legislation will be made in the near future. The programme which forms the subject of this article was applied to 14 herds comprising 1,500 cows where trauma from milking machines is considered of major importance in the causation of mastitis. The programme consisted in studying the different parts of milking machines as possible causes of mastitis, applying the California mastitis test and treatment where necessary. Good results were reported at the end of the year.

—T.E.G.R.

Mura, D. & Pisanu, S. (1960). **Primi risultati conseguiti nella profilassoterapia della mastite streptococcica bovina mediante l'impiego di un vaccino antibiotato. [An antibiotic-treated vaccine against bovine streptococcal mastitis.]** — Vet. ital. 11, 449-458. [Summaries in English, French and German.] 3456

A suspension of several strains of *Str. agalactiae* was treated with penicillin at a conc. of 0.5 mega-units per 100 ml. This preparation was tried on a herd of 126 cows of which 55 had chronic catarrhal mastitis. In the infected and non-infected groups some animals were inoculated with 4, 5 and 7 ml. at 6-day

intervals; the rest were untreated controls. Among the infected cows 51% of the vaccinated animals recovered; infection persisted in all non-vaccinated animals. In the non-infected group 50% of the non-vaccinated and 21% of the vaccinated animals became infected.—T.E.G.R.

Gourlay, R. N. (1960). **Septicaemia in vervet monkeys caused by *Streptococcus pyogenes*.** — J. comp. Path. 70, 339-345. [Author's conclusions modified.] 3457

In an epidemic of septicaemia due to group A haemolytic streptococci in about 100 vervet monkeys in captivity in Uganda about 30 deaths occurred, P.M. examinations were made on 15 and *Str. pyogenes* was isolated in pure culture from 11. Treatment with penicillin, and the administration of chlor-tetracycline in the food, proved effective in control.

The pathological picture, and the morphological, cultural and biochemical characteristics, antibiotic sensitivity and fibrinolytic activity of the causal organism are described. The strains isolated proved untypeable with the usual typing sera and they produced a fibrinolysin capable of lysing vervet monkey, as well as human, fibrin. These strains may be endemic in the local wild monkey population and may possibly represent a new type.

Wilssens, A. & De Vleeschauwer, A. (1959). **Enterococci in calves' faeces.** — J. appl. Bact. 22, No. 3 p. vii of Proceedings. 3458

A qualitative study was made of the enterococcal flora of the faeces of calves between a few days and three months old. The diet was at first colostrum and whole milk, but later milk substitute was gradually introduced. Faecal samples were collected by rectal swabs. Isolations were made on the medium of Barnes, and the enrichment media

described by Hajna & Perry and Rosenow were used.

In very young calves *Streptococcus faecium* was the predominant organism, in contrast to the enterococcus flora of bovine faeces where *Str. faecalis* is practically absent; more information was needed on the influence of diet on the flora.—R.M.

Elliott, H. B., Twiehaus, M. J., Ward, M. K., Worchester, W. W. & van Ness, G. B. (1960). **Laboratory diagnosis of anthrax.**—Proc. 63rd Meet. U.S. Livestock Sanit. Ass. San Francisco, 1959. pp. 399-405. 3459

The techniques for collection, maintenance and dispatch of suspect specimens and for bacteriological and cultural examination are described. Bacteriophage is a reliable means of differentiation from other aerobic spore-forming organisms. Isolation of the bacillus from animal by-products is discussed and two procedures are recommended—direct culture and animal inoculation. Factors of value in the identification of *B. anthracis* are: morphology of the colonies on nutrient and blood agar; slight or no haemolysis within 24 hours on blood agar; and susceptibility to lysis by specific bacteriophage.—T.E.G.R.

Harnach, R., Mesároš, E. & Pleva, V. (1960). Rezistence terénnych kmenu *Bac. anthracis* k penicilínu, streptomycínu a aureomycínu po spontánni a řízené adaptaci. [**Resistance of field strains of *B. anthracis* to penicillin, streptomycin and chlortetracycline after spontaneous and experimental adaptation.**]—Vet. Cas. 9, 56-64. [In Czech. Summaries in English. French, German and Russian.] 3460

Of a number of *B. anthracis* strains isolated in Czechoslovakia, 66 were resistant to antibiotics. Of these 51 resisted doses of 1-9 i.u. of penicillin/ml. medium, and 15 strains doses of 14-30 i.u. After experimental adaptation 63 were resistant to doses ranging from 1-120 i.u./ml., and three to doses up to 5,000 i.u./ml. The majority resisted doses of 1-4 µg./ml. of streptomycin, four strains doses up to 20 µg. and one 35 µg. After experimental adaptation they resisted doses ranging from 4-75 µg. and some even 10,000 µg. Adaptation of *B. anthracis* to chlortetracycline was rare.—E.G.

Seifert, H. (1960). Eine spezifische Milzbrand-schutzimpfung für die Verhältnisse der Rinderhaltung im Tal des Rio Chicama/Peru. [**Specific anthrax vaccination in cattle adapted to the conditions in the Rio Chicama Valley,**

Peru.]—Dtsch. tierärztl. Wschr. 67, 356-360. [Summary in English.] 3461

Cattle brought from the mountains of northern Peru for slaughter in the coastal areas are highly susceptible to anthrax. As many as 75% die from the disease within 14 days of arrival. A method of protection was developed, consisting of simultaneous s/c injection of 150 ml. of hyperimmune serum prepared in cattle and i/d injection in the caudal fold of 0.5-0.75 ml. of spore emulsion. Anthrax did not develop in 6,500 cattle protected by this method, nor in 700 cattle given freeze-dried spore emulsion with or without the serum. The spore emulsion was freeze-dried in 20% glucose soln. and withstood 12 months' storage.—M.G.G.

Davies, D. G. (1960). **The influence of temperature and humidity on spore formation and germination in *Bacillus anthracis*.**—J. Hyg., Camb. 58, 177-186. [Author's summary modified.] 3462

The sporing time of *B. anthracis* is prolonged considerably as the humidity decreases, both at 26° and 37°C. The effect is less noticeable at the lower temperature.

A temperature range of 20°-44°C. permitted germination of the five strains tested. Above a temperature of 39° and below 30° germination time lengthened considerably.

Both at 26 and 37° no germination could take place at a relative humidity of 80% or below. Germination time was considerably prolonged when the humidity value fell below 100%.

Londrillo, A. (1960). Ricerche sull'azione dell'eritromicina in cavie inoculate con *B. anthracis*. [**Erythromycin in experimental anthrax in guinea-pigs.**]—Boll. Soc. ital. Biol. sper. 36, 59-62. 3463

Erythromycin, in experimentally infected g.pigs, was more effective when administered in the early stages of infection.—T.E.G.R.

Jamieson, S. (1960). **Bovine tuberculosis. Problems and prospects of eradication.**—N.Z. J. Agric. 100, 314-315, 317 & 319. 3464

There are 2 schemes for the eradication of TB. in New Zealand, a compulsory one for the farms supplying drinking milk, and a voluntary one for farms supplying milk for manufacture into dairy products. In 1950, 7.8% of the cattle in the first scheme had TB. The incidence is now 1.1%, and 1,870 of the 3,000 herds are free from TB. The second scheme started in 1958. In initial tests in

2,608 herds 10·8% of the cattle reacted. In a second test in 275 herds 2% reacted.

—M.G.G.

Ranney, A. F. (1960). **Status of State-Federal cooperative tuberculosis eradication.** — Proc. 63rd Meet. U.S. Livestock Sanit. Ass. San Francisco, 1959. pp. 182-191. 3465

Among 8,187,161 cattle tested in 1959 there were 18,914 reactors (0·23%, the highest percentage since 1946). The number of accredited herds was 52,946, the lowest since 1924. Although eradication is not yet in sight prospects are encouraging. The various aspects of the eradication programme are discussed.—T.E.G.R.

Berman, D. T., Tervola, C. A. & Erdmann, A. A. (1960). **Preliminary report of investigations of tuberculin sensitivity in Wisconsin cattle.** — Proc. 63rd Meet. U.S. Livestock Sanit. Ass. San Francisco, 1959. pp. 197-204. 3466

Of 16,348 cattle tested by the caudal fold test 284 were reactors (size of reaction P_1 , X_2 or greater—standards suggested by the Animal Disease Eradication Service); 1,764 were "deviators" (any palpable deviation less than P_1 or X_2); 14,300 were negative. The reactors were later subjected to a comparative test, some receiving 0·1 ml. of tuberculin as made by the Agricultural Research Service (ARS); some received 0·1 ml. of avian tuberculin; and the rest received 0·05 ml. of "contract" tuberculin. Additional comparative tests were made on 172 reactors within 48 hours. I/d injections were made in random sites in the neck with: "contract", ARS and avian tuberculins and johnin, in 0·1 ml. and 0·05 ml. doses; Weybridge PPD avian and mammalian tuberculins in 0·1 ml. doses; and normal saline soln. containing 0·5% phenol and 0·5% glycerol, in 0·1 ml. doses. The animals were then slaughtered and tissues collected for microscopic and cultural examination. These comparative tests were also applied to 117 non-reactors. Results are tabulated and discussed in detail; final evaluation of the data will be made on completion of the bacteriological studies.—T.E.G.R.

Lukas, G. N. (1960). **Laboratory confirmation of bovine tuberculosis.**—Proc. 63rd Meet. U.S. Livestock Sanit. Ass. San Francisco, 1959. pp. 364-366. 3467

Specimens in which acid-fast bacilli are not demonstrable by direct smear are processed by digestion and concentration for

culture and animal inoculation. Histological examination is done if there is sufficient material. Procedure, technique used and differential diagnosis of granulomatous lesions simulating TB. are discussed.—T.E.G.R.

Gräub, E. & Vonarburg, H. (1960). Über eine die Entwicklung der Tuberkulosebakterien hemmende Substanz bei mit dem P-Stamm schutzgeimpften Kühen. [A substance inhibiting development of tubercle bacilli in cows immunized with Strain P.]—Schweiz. Arch. Tierheilk. 102, 296-306. [Summaries in English, French and Italian.] 3468

Twelve cows that had been immunized 4-6 years previously with Strain P, an attenuated bovine strain of *Mycobacterium tuberculosis*, and were positive to the i/d test were slaughtered. Lymph nodes in 2 contained virulent tubercle bacilli and in a third tubercle bacilli stated to be Strain P. Primary cultures from the 3 cows took 5-9 weeks to develop, and g.pigs inoculated with the virulent strains died from TB. after 11-54 weeks. But subcultures of the 3 strains developed in 3-5 weeks and a second passage of the virulent strains in g.pigs caused death in 3-15 weeks.—M.G.G.

I. Patterson, D. S. P. (1960). **The effect of trace metals on the growth and metabolism of *Mycobacterium tuberculosis* avium.** — Tubercle, Lond. 41, 191-202. 3469

II. Patterson, D. S. P. (1960). **The isolation of coproporphyrin III from *Mycobacterium tuberculosis* avium.** — Biochem. J. 76, 189-193. [Author's summaries modified.] 3470

I. The cultivation and metabolism of the avian type bacillus on synthetic media was studied with particular reference to the trace element status of the media. The effect of cobalt and/or zinc ions is to stimulate growth, the utilization of medium glycerol and the production of coproporphyrin III.

Irrespective of trace element supplementation, the yield of organisms was directly related to degree of glycerol utilization; the amount of coproporphyrin produced was also related to this. Both these correlations were highly significant in 39-day and 46-day cultures.

The yield of coproporphyrin was also dependent upon the age of the culture, maximum yield being obtained at about the same time as maximum growth, i.e., 45 days at 37°C.

The stimulative effect of zinc ions was dependent upon the presence of sufficient iron

in the medium. With no added iron, 2-64 p.p.m. Zn^{2+} had no effect but with as little as 2 p.p.m. Fe^{+} stimulation of growth, glycerol utilization and coproporphyrin production were almost maximal.

A given supplement of 4 p. p. m. Zn^{2+} stimulated the growth of a 46-day culture about 4 times, glycerol utilization about 5 times and coproporphyrin production about 100 times. It was therefore concluded that zinc had a specific effect on the production of free coproporphyrin.

The findings appeared to support either of two possible mechanisms which were suggested for the stimulation of free coproporphyrin production by zinc in the presence of iron.

Another result of zinc supplementation is to modify the nitrogen metabolism of the bacillus. Organisms grown on Zn supplemented media are richer in nitrogen and when autoclaved in phosphate buffer, pH 9, up to 4 times more tuberculoprotein is released than in the case of those grown on unsupplemented media.

II. Cold acetone extracts of avian-type bacilli cultivated on synthetic media containing trace-element supplements were often heavily pigmented. The pigment was isolated and identified as free coproporphyrin III.

Of the 12 mycobacterial-cell suspensions examined, those with a high coproporphyrin content had a low catalase activity, whereas those low in coproporphyrin had most enzyme activity. This result is discussed.

van Dorssen, C. A. (1960). Infectie met *Mycobacterium microti* bij een kat. [*Pneumonia caused by the murine type of tubercle bacillus in a cat.*] — Tijdschr. Diergeneesk. 85, 404-412. [In Dutch. Summaries in English, French and German.] 3471

The strain isolated from the cat was tested for pathogenicity by inoculation into lab. animals, 5 field mice and a heifer. The heifer (and another inoculated with an established strain of the murine type) reacted positively to bovine tuberculin, but only slightly to avian tuberculin, 1½, 4 and 7 months after s/c infection. It was slaughtered 7 months after infection: the only lesion was in the lymph node nearest the site of inoculation. An account in English of this work was published by Huitema & van Vloten in *Antonie v. Leeuwenhoek J. Microbiol.* 26, 235-240 (1960).—R.M.

I. Neumann, R. (1959). Hodnocení M-vak-

cinace, prováděné v terénu po dobu šesti roku, a použití simultánních testů pro rozlišení postinfekční alergie. [Evaluation of a vaccine from a murine strain of tubercle bacillus, and simultaneous tuberculin testing for the differentiation of post-infection allergy.]—Sborn. čes. Akad. zemědělsk. Věd. vet. Med. 4, [Nos. 7-9.] 657-672. [In Czech. Summaries in English and Russian.] 3472

II. Hejliček, K. (1959). Studium biologických vlastností *Mycobact. murium* na prasatech. [Study of the properties of a murine strain of tubercle bacillus in pigs.]—Ibid. 717-720. [In Czech. Summaries in English and Russian.] 3473

I. During 1952-1958, 300 calves from tuberculin-positive dams were vaccinated with 2.5 ml. of a murine strain tubercle bacillus [V.B. 25, 2661; 28, 3827] at the age of three days, and again at four weeks. At 12 months they were revaccinated with 5 ml. In about 18% immunization failed, but the disease was milder than normal. Post-vaccination sensitivity to tuberculin was demonstrated in about 90% of the animals.

II. Three pigs negative to bovine and avian tuberculin were infected i/v with 0.1 mg./kg. body weight of "Strain M119", a murine strain of *Mycobact. tuberculosis*. All three developed miliary pulmonary lesions, two also had lesions in the portal lymph nodes. Of a batch of eight non-reactors injected s/c with doses ranging from 0.1-2 mg./kg. body wt., in six there was abscess formation at the site of injection, in two accompanied by gross lesions in the regional lymph nodes, in another two by isolated lung lesions. Post-vaccination allergy was most severe after 21 days, but tuberculin reactions were not very marked. This experiment appeared to indicate that the murine strain was more pathogenic for pigs than for other domestic animals.—E.G.

Butyrina, P. S. (1959). [Immunization of fowls against tuberculosis with dried BCG vaccine.] — Sborn. Rabot Sibirsk. nauchno-issled. vet. Inst. 8, 89-100. [In Russian.] 3474

BCG given by mouth in a dose of 1 mg. to month-old chicks and repeated a month later protected 60% of birds from massive experimental infection.—R.M.

Patterson, D. S. P. (1960). The lipids of Weybridge PPD.—Tubercle, Lond. 41, 186-190. [Author's summary.] 3475

The preparation of acetone- and ether-dried powders from Weybridge PPD was accompanied by the loss of about 10% of the

weight of the resulting powders as lipid material which dissolved very readily in these organic solvents. The residual lipid, most of which was rather firmly bound to the tuberculo-protein, could be removed successively with a chloroform-methanol mixture and with acidified ether-ethanol.

The surface activities of different tuberculo-protein preparations in aqueous solution were measured. Those containing high proportions of lipid were the most active. The lipid fraction apparently increases the tendency of tuberculin to be adsorbed at glass/liquid interfaces and is therefore partly responsible for the so-called 'volume effect' which is observed in stored dilutions of tuberculin.

Another possible function of the lipid moiety is to minimize the destruction of the biological activity of tuberculin at elevated temperatures.

Novikova, M. P. (1959). [Method of preparing antigen for the complement fixation test for Johne's disease.] — *Sborn. Rabot Sibirsk. nauchno-issled. vet. Inst.* 8, 153-156. [In Russian.] 3476

Previous work had shown that the most sensitive antigen was one prepared by a method similar to that used by Boquet & Nègre (1923) for tubercle bacilli [*Sborn. Rabot Sibirsk. vet. Inst.* 7, 183 (1957)]. Preparation and titration of the antigen were described. The test gave positive reactions with sera from 8.5% of 5,570 cattle and 15% of 5,421 sheep. It was claimed that every clinical case was detected by the test, but there are no data.—R.M.

Donnelly, A. D. (1960). Observations on the prophylaxis of bovine 'summer' mastitis by dapsone and penicillin.—*Irish vet. J.* 14, 128-131. [Author's summary.] 3477

The incidence of 'summer' mastitis due to corynebacterial or staphylococcal infection was studied over four years in some 300 cows. Incidence was reduced from 13.6% to 1.1% by the use of a dapsone/penicillin intramammary preparation specially formulated to give prolonged milk and tissue levels. The special pathology of this type of mastitis, and some aspects of dapsone pharmacology are discussed.

Münker, W. & Kleikamp, I. (1960). Untersuchungen über die Corynebakterien im Bullensperma. [*Corynebacteria in bull semen.*]—*Berl. Münch. tierärztl. Wschr.* 73,

151-153. [Summary in English.] 3478

Corynebacteria were isolated from 61.8% of 260 samples of bull semen. Of 72 isolates, 5 were *C. pyogenes*, 9 *C. renale*, 7 differed slightly from *C. renale*, 3 were *C. pseudodiphtheriticum* [hofmanni], one was *C. bovis*, 2 were *C. hoagii*, 2 differed slightly from *C. hoagii*, and 43 which could not be identified were considered to be saprophytes.—M.G.G.

Yashenkina, M. I. (1959). [Clinical manifestations and course of experimental listeria infection of pigs.] — *Trudy vsesoyuz. Inst. eksp. Vet.* 22, 93-103. [In Russian.] 3479

Pigs were inoculated i/v, i/m, i/p or conjunctivally with *E. monocytogenes* isolated from cattle, sheep, pigs and horses. The strain from horses was the most pathogenic. The majority of pigs infected with this strain died within 66 hours. Clinical and P.M. findings resembled those in natural cases.—M.G.G.

Kukharkova, L. L., Adutskevich, V. A., Boyarshinov, P. K. & Perova, P. V. (1960). [Diagnosis of listeria infection in pigs and sheep before and after slaughter.] — *Veterinariya, Moscow* 37, No. 5 pp. 61-66. [In Russian.] 3480

A histopathological study of 8 pigs and 12 sheep experimentally infected and 22 pigs and 27 sheep infected naturally revealed that the lesions (which closely resembled those of paratyphoid) were commonest in the liver; brain lesions occurred in about half of the animals. The organism was repeatedly isolated from apparently normal organs, particularly heart, kidneys and spleen from infected animals.—R.M.

Nordland, O. S. (1960). Host-parasite relations in initiation of infection. III. Hyperglycemia without stress in experimental infection with *L. monocytogenes*. — *Canad. J. comp. Med.* 24, 88-95. 3481

Altering the carbohydrate metabolism in hamsters, obese mice and normal mice by experimental induction of hyperglycaemia allowed proliferation of *Erysipelothrix (Listeria) monocytogenes* and possibly other glucose-fermenting pathogenic agents.

Previous studies [*V.B.* 30, 2077-78] had shown that bringing together of host and parasite was not certain to result in disease. However, should the internal environment of the host be suitable to the invading organism, disease may be the outcome, and under conditions of stress an invading pathogen may produce a more acute illness. Hyperglycaemia

might be the trigger mechanism that directly or indirectly initiates infection when host and parasite are brought together.

—R. V. L. WALKER.

Kukharkova, L. L., Boyarshinov, P. K., Adutskevich, V. A. & Perova, P. V. (1960). [Judgement of meat from animals with *listeria* infection.]—*Veterinariya*, Moscow 37, No. 3 pp. 74-79. [In Russian.] 3482

Distribution of *Erysipelothrix* (*Listeria monocytogenes*) was studied in various tissues and organs in animals that died or were killed after experimental infection. It occurred in muscle in 11 of 30 rabbits, 3 of 10 pigs and 6 of 10 sheep. In sausages the organism was killed by boiling them for about an hour (until the interior of the sausage reached 69°-72°C.).

—R.M.

Süveges, T. (1960). Juhok pasteurellák okozta tőgygyulladás. [*Pasteurella* as the cause of ovine mastitis.]—*Mag. állator. Lapja* 15, 214-216. [In Hungarian. Summaries in English and Russian.] 3483

Mastitis caused by *pasteurella* was found in 18 ewes in a flock of 235, mainly in mid-lactation. In all the condition was unilateral. Management of the flock, epidemiology, symptoms and the P.M. and microscopic lesions are described with special reference to differentiation from staphylococcal mastitis. From the milk and udder of the affected ewes a *Pasteurella* organism was isolated which differed from *Past. septica* in that it was markedly haemolytic and failed to cause disease in lab. animals, and from *Past. haemolytica* in that it produced indol and failed to ferment lactose. It was resistant both *in vitro* and *in vivo* to penicillin but was susceptible to streptomycin and the sulphonamides which cured the condition.

—A. SEBESTENY.

Smith, G. R. (1960). The pathogenicity of *Pasteurella haemolytica* for young lambs.—*J. comp. Path.* 70, 326-338. [Author's conclusions modified.] 3484

The high susceptibility of 3-week-old lambs and the high resistance of young adult sheep to infection with Type A *Past. haemolytica* were demonstrated. The lesions in lambs were similar to those in lambs infected naturally and marked bacterial multiplication occurred *in vivo*. I/p inoculation of small doses resulted in rapidly fatal peritonitis. I/v inoculation gave rise to a similar disease or to protracted infections

according to size of the inoculum. The protracted cases had a variety of lesions which included pneumonia. Pneumonia and also generalized infection were produced by intra-tracheal inoculation of larger doses.

Biondi, E. (1960). Ricerche sull'azione del cloramfenicolo nella pasteurellosi sperimentale delle cavie. [*Chloramphenicol therapy in experimental pasteurellosis of guinea-pigs.*]—*Zooprofilassi* 15, 131-135. 3485

Chloramphenicol, injected i/p, did not prevent death but prolonged the survival time.

—T.E.G.R.

Fedorov, V. N. (1960). Plague in camels and its prevention in the USSR.—*Bull. World Hlth. Org.* 23, 275-281. [In English. Summary in French. Author's summary modified.] 3486

In 1954-56 in a series of experiments in Central Asia, camels were infected with *Pasteurella pestis* by infesting them with *Ixodes* and *Argas* ticks previously fed on plague-infected lab. animals. Subcutaneous, intradermal and intravenous injection was also used. The camels varied markedly in their susceptibility to plague, which in general was relatively low.

Prophylactic studies are also reported. Vaccination with dried live vaccine injected in a single dose of 30,000 million organisms engendered a sufficiently high degree of immunity in adult camels. Spraying the coat with insecticide is also recommended.

Weiss, D. W. (1960). Enhanced resistance of mice to infection with *Pasteurella pestis* following vaccination with fractions of phenol-killed tubercle bacilli.—*Nature*, Lond. 186, 1060-1061. 3487

The resistance of mice to i/p injection of *Past. pestis* was enhanced by previous i/p injection of methanol extract of phenol-killed B.C.G. organisms in incomplete Freund's adjuvant or in saline, or the bacterial residue of the methanol extract, or living B.C.G.

—M.G.G.

Bouckaert, J. H., Oyaert, W. & Sierens, R. (1960). Gutödem beim Schwein. [*Oedema disease in swine.*]—*Dtsch. tierärztl. Wschr.* 67, 349-351. [Summary in English.] 3488

Pigs were inoculated i/v with a lipopolysaccharide fraction of toxin obtained from haemolytic *Escherichia coli* by ultrasonic destruction. Clinical signs and P.M. lesions of oedema disease were observed. Pigs remained normal, however, after oral

administration of bacterial culture or injection of the toxin into the small intestine, but 5 out of 6 developed high agglutination titres to the *E. coli* strain. These titres did not protect the pigs against i/v injection of the toxin. The sensitivity of the growing pig to endotoxin was discussed, with reference to growth hormone, thyroxine, and deficiency of vitamin E, amino-acids and selenium.—M.G.G.

Warden, W. K. & Schaible, P. J. (1960).

Effect of feeding *Escherichia coli* to turkey poults and chicks in the presence of certain antibiotics.—Poult. Sci. 39, 728-734. [Authors' summary modified.] 3489

Pure cultures of *E. coli*, introduced into the digestive tract *via* the crop, had no effect on the antibiotic, growth-stimulating mechanism in turkey poults or broiler chicks.

Sakazaki, R., Namioka, S., Osada, A. & Yamada, C. (1960). **A problem on the pathogenic role of *Citrobacter* of enteric bacteria.**—Jap. J. exp. Med. 30, 13-21. [In English.] 3490

The authors typed 669 cultures belonging to the Bethesda-Ballerup group of paracolon bacteria [*Citrobacter* group], isolated from faeces, organs and tissues of man and unspecified animals. It was concluded that the organisms are normal inhabitants of the digestive tract and most types are not pathogenic. It was possible that types possessing O antigens related to the salmonella group caused gastro-enteritis.—R.M.

Geurden, L. M. G., Devos, A. & Van den Wyngaert, M. (1960). Onderzoekingen omtrent de *Salmonella*-types geïsoleerd en geïdentificeerd in het laboratorium tijdens de periode 1957-59. [***Salmonella* types isolated and identified at Ghent during 1957-59.**—Vlaams diegeneesk. Tijdschr. 29, 159-170. [In Flemish. Summaries in English, French and German.] 3491

A previous report dealt with the period 1941-1956 [*V.B.* 28, 34]. The present report concerns 192 strains belonging to 32 types and their hosts, and the findings are summarized in two tables. 84 of the strains were *S. typhimurium*, mostly of human origin. *S. berta* was isolated from a calf with polyarthritis; it has not been isolated from cattle before. Four strains of *S. newington* were isolated from polyarthritis in a foal, an apparently healthy pig, and from foodstuffs.—R.M.

Gray, D. F., Harley, O. C. & Noble, J. L. (1960). **The ecology and control of *Sal-***

***monella* contamination in bonemeal.**—Aust. vet. J. 36, 246-252. [Abst. from authors' summary.] 3492

Over 90% of bonemeal in Australia was contaminated by *Salmonella* organisms which can survive in bonemeal for several years. When contaminated bonemeal is added to concentrates, salmonella organisms may multiply and endanger public health.

Although most *Salmonella* are destroyed during processing, some survive and the whole product may become uniformly contaminated during drying and milling. Chemical control of contamination is possible, but is not recommended.

A bonemeal free from salmonella infection has been continuously produced, despite heavy environmental contamination, by using a closed system of high temperature drying instead of an open process of slow drying, and by protecting the product during milling and bagging.

Thomas, C. & Wilson, J. B. (1960). **Association of resistance to bile salts and virulence in *Salmonella typhimurium* strains.**—Proc. Soc. exp. Biol., N.Y. 103, 292-294. 3493

Ability of *S. typhi-murium* to tolerate bile salts in culture was associated with increased virulence for mice as judged by changes in the internal organs. The studies were made with a parent strain sensitive to bile salts, 3 tolerant mutants and a sensitive reversion.—M.G.G.

Quesada, A., Izzi, R. & Capurso, A. (1959). Il ruolo del gallo nella diffusione della pullorosi. Nota III: Prove di trasmissione diretta della malattia da galli sperimentalmente infettati a galline sane. [**Role of cocks in the spread of *Salmonella pullorum* infection. III. Direct transmission from experimentally infected cocks to hens.**—Atti Soc. ital. Sci. vet. 13, 666-670. [Summaries in French and German.] 3494

Sexually mature cocks were artificially infected with a suspension of *S. pullorum* by the oral or cloacal route. Infection was confirmed serologically and culturally. Five of these birds were then placed with 18 healthy adult hens in which infection was diagnosed serologically from the 26th day onwards. Seminal fluid from an infected bird was instilled into the cloaca of a hen and infection was confirmed serologically after 18 days; blood cultures were always negative. It is concluded that infected cocks may transmit the disease.—T.E.G.R.

Cerruti, C. G., Izzi, R. & Maggio, V. (1959). Sulla presenza della *Salmonella pullorum* nei vari organi di galline positive alla prova sierologica per la pullorosi. [**Presence of *Salmonella pullorum* in organs of infected hens.**]—Atti Soc. ital. Sci. vet. 13, 671-674. [Summaries in French and German.] 3495

Lesions were observed P.M. in various organs, notably the ovaries, of 10 apparently healthy hens which had given positive reactions to repeated agglutination tests. The organism was isolated from the ovaries of 7, liver of 2, spleen of 1 and gall bladder of 1.

—T.E.G.R.

Buxton, A. (1960). **Pathological changes in the blood of chickens infected with *Salmonella gallinarum*.**—J. comp. Path. 70, 308-325. [Author's conclusions modified.] 3496

Chickens fatally infected with fowl typhoid may develop a severe haemolytic anaemia. During the three days preceding death, haemoglobin concentrations declined rapidly to about half or a quarter of the normal 12 to 17 g. per 100 ml. Chickens which survived oral dosage with *S. gallinarum* had reduced Hb on the 8th day after infection, and the level began to return to normal on the 10th to 14th days in those birds which became clinically normal. However, in chickens which died a few weeks later, Hb remained constant at 6 to 8 g. per 100 ml.

During the acute stage of infection, circulating erythrocytes developed abnormal osmotic fragility, characteristic of a generalized bacterial infection.

These results are discussed in relation to the *in vivo* adsorption of *S. gallinarum* polysaccharide on to erythrocytes and to the responses of other animal species and man to similar endotoxins.

Henderson, W., Ostendorf, J., Jr. & Morehouse, G. L. (1960). **The relative pathogenicity of some salmonella serotypes for chicks.**—Avian Diseases 4, 103-109. [Authors' summary modified.] 3497

Seven salmonella serotypes were given orally in graduated dosage to day-old chicks. *S. typhi-murium*, *indiana*, *enteritidis*, *heidelberg* and *reading* were used in separate experiments. *Salmonella senftenberg* and *Salmonella anatum* were each used in two separate experiments. All seven serotypes, under nearly ideal brooding conditions in batteries, produced mortality varying from about 2% (*S. anatum*) to 80% (*S. typhi-murium*) in day-old chicks. One immediate chick passage

of *S. senftenberg* did not greatly increase the mortality it caused. With *S. anatum*, exposure of the infected chicks to their own faeces greatly increased mortality but did not extend the period over which it occurred.

Tailyour, J. M. & Avery, R. J. (1960). **A survey of turkey viscera for salmonellae, British Columbia.**—Canad. J. publ. Hlth 51, 75-77. [Summary in French.] 3498

Salmonella derby was isolated from 4 of 523 apparently healthy slaughtered turkeys.

—R.M.

Rice, C. E., Magwood, S. E. & Annau, E. (1960). **A modified direct complement-fixation test for the detection of antibodies for *Salmonella* antigens in turkey sera.**—Canad. vet. J. 1, 132-137. [Summary in French. Authors' summary modified.] 3499

The modified test developed by Brumfield & Pomeroy [*V.B.* 29, 1460] for the diagnosis of psittacosis in turkeys was applied to detect antibodies in antisera produced in turkeys against different types of *Salmonella*. Unheated pre-tested normal chicken serum was mixed with the diluted g.pig complement before its addition to the heat-inactivated turkey antisera. The chicken serum supplies some heat-labile factor essential for the fixation of g.pig complement by the heated turkey antiserum with homologous antigen, no fixation being obtained in its absence.

Partly purified somatic antigens were prepared from cultures of nine types of salmonella, three of Group B, four of Group C, one of Group E and one of Group G. The reactions recorded with these antigens were group-specific. Heated normal turkey sera, in dilutions of 1:10 and higher, showed no fixation with these salmonella fractions.

Daikos, G. K., Athanasiadou, M., Deligeorgi, E. & Papadoyanakis, N. (1960). **Susceptibility of *Salmonellae* to kanamycin and other antibiotics.**—Antibiot. & Chemother. 10, 337-340. [Summary in Spanish p. 388. Authors' summary modified.] 3500

The susceptibility of 25 strains of salmonella to kanamycin was tested. This antibiotic proved effective in a relatively low conc.: all strains were inhibited by 2.5 µg./ml. and most of them by 1.25 µg./ml. Lower concentrations were ineffective. Comparative studies of the same 25 and an additional 7 strains with other antibiotics proved that kanamycin was the most effective. Next came chlortetracycline, oxytetracycline, chloram-

phenicol, and tetracycline. The mixture of tetracycline-oleandomycin was less active and streptomycin was ineffective.

Mingle, C. K. (1960). **The state-federal brucellosis eradication program.**—Proc. 63rd Meet. U.S. Livestock Sanit. Ass. San Francisco, 1959. pp. 76-82. 3501

The satisfactory progress made during the past 5 years is being retarded by financial problems. Support for the "cull and dry cow" testing programme is considered essential as this procedure will contribute to the eventual complete eradication of brucellosis. In the U.S.A., Puerto Rico and the Virgin Islands 57% of all counties qualified as Modified Certified Brucellosis Areas and provisions are urgently needed for the establishment and maintenance of Certified Brucellosis-Free Areas—a status which about 500 counties will soon attain. Over a period of 10 years there was a reduction of 75% in the estimated annual economic losses caused by the disease.
—T.E.G.R.

McDiarmid, A. (1960). **Symposium on brucellosis. II. Surveys of brucellosis in Oxfordshire and in the Isle of Wight.**—Vet. Rec. 72, 423-424. 3502

In 1959 tests for brucella infection were made on 1,751 samples of churn milk from 662 farms in Oxfordshire and on 2,480 samples of churn milk from 582 farms in the Isle of Wight. In Oxfordshire 8% of the farms supplied milk that was positive to the whey tube test and 4.4% supplied milk positive to the g.pig inoculation test. In the Isle of Wight the respective percentages were 8.4 and 2.2. Of 25 brucella strains recovered, 22 were typical *Br. abortus*, 2 were typical *Br. melitensis*, and one was an aberrant dye-sensitive strain of *Br. abortus*. Much of the infection on the farms supplying the contaminated milk was subclinical.—M.G.G.

Pleva, J. & Beninghaus, T. (1960). **Porovnávacie štúdium F alergénu pri detekcii brucelózy rožného dobytku. [Comparative study of F-allergen in the diagnosis of bovine brucellosis.]**—Vet. Cas. 9, 74-79. [In Slovak. Summaries in English, French, German and Russian.] 3503

From a comparative evaluation in 389 cattle of the agglutination test, c.f. test, ring test and Coombs test with an allergic test using "F-antigen" (a polysaccharide prepared by hydrolysis of brucella), it was concluded that the allergic test was suitable only as a

supplementary test in veterinary practice because of the comparatively large number of doubtful reactions and the occurrence of positive reactions in herds infected with TB., but free from brucellosis.—E.G.

Galanis, N. (1959). **Contribution à l'étude de la brucellose bovine en inspection des viandes. [Bovine brucellosis and meat inspection.]**—Bull. Acad. vét. Fr. 32, 695-701. 3504

Cultural and biological tests with diaphragmatic muscle of infected cows gave negative results and it is concluded that the danger from ingestion of meat from animals with chronic infection is negligible.

—T.E.G.R.

I. Stuart, J. E., Bills, C. B., DeMattei, J. D. & Mace, D. L. (1960). **The results of eleven years' vaccinating with strain 19.**—Proc. 63rd Meet. U.S. Livestock Sanit. Ass. San Francisco, 1959. pp. 83-90. 3505

II. Manthei, C. A. (1960). **Summary of controlled research with Strain 19.**—Ibid. pp. 91-97. 3506

I. Calhhood vaccination with Strain 19 (compulsory for dairy and voluntary for beef cattle) was started in California in 1948. Incidence of brucellosis dropped from 17-18% to 2% in dairy cattle and from 7-9% to 0.7% in beef cattle. To date, 24 counties have been certified and 16 more will be shortly. In beef cattle in semi-range areas the degree of infection was proportional to the degree of vaccination—in herds with 75-100% vaccinated animals it was half that of herds with few or no vaccinated animals. It is considered that a well-enforced vaccination programme will appreciably reduce, though probably not eradicate, the disease among beef cattle. Vaccination eliminated the disease from many closed dairy herds but testing and culling was necessary in about 11% of herds. In open herds the degree of infection was higher.

II. The vaccine requires careful handling to ensure maximum viability and its efficacy in calhhood vaccination is affected by dosage, individual immunological response and exposure to virulent *Br. abortus*. Calves should be vaccinated at 4-8 months in order to avoid interference with the agglutination test. The degree and duration of immunity of calhhood vaccination is equal to that of adult vaccination and does not decrease as the animals grow older. Revaccination is unnecessary, undesirable and unpractical. The vaccine suppresses clinical brucellosis but does not always prevent infection. About 65-75%

will be completely protected while the remainder will have varying degrees of protection. It is considered that where the majority of heifer calves are vaccinated animal infection will be reduced by 80% and herd infection by 20%. The vaccine controls but does not eradicate brucellosis, it has no beneficial effect on infected animals.

—T.E.G.R.

Tsuverkalov, D. A. (1960). [Creation of immunity to brucellosis by means of bacterial protein.]—*Veterinariya*, Moscow 37, No. 4 pp. 31-33. [In Russian.] 3507

Bacterial protein referred to as "B-2 protein" was extracted from the sediment remaining from acid hydrolysis of brucella cultures during preparation of brucella hydrolysate diagnostic allergen. By repeated hydrolysis a protein fraction was obtained which was resistant to and insoluble in acid. It was neither hapten nor antigen but when inoculated into a few rabbits it stimulated formation of agglutinins.—R.M.

Peterson, J. E. (1960). **Experimental Brucella abortus Strain 19 infection of rams.**—*Aust. vet. J.* 36, 270-277. [Author's summary modified.] 3508

Twenty-one Merino rams aged 9 months to 5 years were injected with *Br. abortus* Strain 19 by intratesticular, intra-epididymal, intravenous or intrapreputal routes and examined for signs of infection during the following 5 to 9 months and then at autopsy.

In 4 rams which had been injected by the intratesticular or intra-epididymal route, infection was demonstrated by the isolation of Strain 19 from the semen. Two of these rams excreted Strain 19 for about 80 days after injection; the other two were still excreting the organism when killed, 9 months after injection. At autopsy, infection was demonstrable only in the seminal vesicles.

Infection could not be demonstrated after the administration of organisms by the intravenous or intrapreputal routes.

The pattern of the rise and fall in the level of serum agglutinins against *Br. abortus* was essentially similar in all animals, irrespective of the route of injection or whether or not demonstrable infection became established.

After intratesticular and intra-epididymal injection of *Br. abortus* Strain 19, complement-fixing antibodies against *Br. ovis* were demonstrated in the serum.

It is concluded that although *Br. abortus*

Strain 19 may be pathogenic for rams when introduced directly into the susceptible tissues of the genital tract, its use in vaccines administered subcutaneously is not likely to prove harmful.

Koshukov, S. D. (1959). [Brain lesions in sheep challenged with *Br. melitensis* after immunization with Strain 19.]—*Sborn. Rabot Sibirsk. nauchno-issled. vet. Inst.* 8, 49-54. [In Russian.] 3509

19 yearling sheep received Strain 19 vaccine by conjunctival instillation of 10^{10} organisms and another 18 were inoculated s/c. 28 of the 37 were killed for histological examination of the brain between 1 and 90 days afterwards. The remaining 9 (5 from the first group and 4 from the second) were inoculated s/c with 300,000 organisms of virulent *Br. melitensis* 38 days after immunization, and were killed 33-35 days later. Parts of the brain examined were cerebral cortex, thalamus, corpus striatum, pedunculus cerebri, pons, medulla oblongata and cerebellum.

No changes were found in the brain of immunized sheep. In sheep challenged after immunization changes were mostly slight, but in isolated cases there were more severe lesions similar to those described in non-immune human beings and animals with brucellosis.

—R.M.

Kochurin, A. I. (1959). [Trials with *Br. abortus* Strain 68 vaccine on sheep.]—*Sborn. Rabot Sibirsk. nauchno-issled. vet. Inst.* 8, 65-70. [In Russian.] 3510

The vaccine described by Yuskovets [*V.B.* 26, 1539] was tried on 2,200 animals comprising ewes, sheep aged 18 months (before service) and lambs aged 5-6 months during an acute outbreak of infection in 4 flocks. Tests done before injection revealed that 35% of ewes and 12-25% of youngstock were infected. Vaccine was injected i/m into the thigh in 3 ml. doses, repeated a year later. Serological reactions two years after first inoculations revealed that only 1.5% of youngstock were infected.—R.M.

Cheremisin, G. G. (1960). [Ring test on milk for diagnosing brucellosis in sheep.]—*Veterinariya*, Moscow 37, No. 3 pp. 87-88. [In Russian.] 3511

Results of ring tests on milk from 703 ewes in an infected flock and from 883 ewes inoculated 1-3 times with Strain 19 vaccine were compared with the results of agglutination and c.f. tests on sera and with the i/d

allergic test, and are shown in two tables. It was concluded that the test was sensitive and specific. The test was positive 20 days after vaccination but negative after 6-12 months.

—R.M.

Lostia, G. B. (1959). Ricerche sull'impiego della reazione ad "anello" sul latte di capra eseguite su 1104 campioni. [The ring test on goat milk.]—G. Batt. Virol. Immun. 52, 335-347. [Summaries in English, French and German.] 3512

The ring test is applicable to goat milk for the diagnosis of brucellosis. Of 1,048 individual milk samples 218 were positive, 252 doubtful and 577 negative. Most of 56 bulk samples were positive. The addition of sheep milk whey did not affect reactions. Formol intensified reactions both in artificially and in naturally infected milk samples and may help in the elimination of false negative reactions.

—T.E.G.R.

Morris, B. (1960). The transmission of anti-brucella agglutinins from the mother to the young in *Erinaceus europaea*.—Proc. roy. Soc. Ser. B. 152, 137-141. 3513

In hedgehogs there was no significant transfer of brucella agglutinins before birth and post-natal transfer was very low. The highest conc. obtained in the sera of unweaned young was only 3% of that in the mother's serum. At parturition milk and serum titres were similar, but with suckling the milk titre fell to about a quarter of the serum titre.

—R.M.

Akhmedov, A. M., Mikailov, M. & Bairamov, N. (1960). [Brucellosis in buffaloes and dogs.]—Veterinariya, Moscow 37, No. 5 26-27. [In Russian.] 3514

In Azerbaijan 353 sera from sheep-dogs were examined for brucellosis. The c.f. test gave 20 positive and 21 doubtful and the agglutination test 6 positive and 5 doubtful. Of the 6 agglutinin-positive sera, 2 were positive and 4 doubtful to the c.f. test, while of 20 c.f.-positive sera 2 were agglutinin-positive and the rest were negative. The authors also examined sera from 158 unvaccinated buffaloes on 4 farms and 2 gave positive reactions to the agglutination test. Of 1,925 buffaloes tested at varying intervals after vaccination, 109 gave positive agglutination tests, the proportion that gave positive c.f. tests ranged from 2.8 to 54.5% according to herd differences. Some positive reactions seemed to persist 46 months after vaccination.

—R.M.

Sulitzeanu, D., Bdolach, A. & Sperling, O. (1960). The fate of killed, radioiodinated *Brucella abortus* injected into mice. II.

Mechanism determining the distribution of the injected bacteria.—J. Immunol. 84, 551-561. [Authors' summary modified.] 3515

Radioiodinated *Br. abortus* organisms inj. i/p into mice are partly phagocytosed in the peritoneal cavity and partly transported to the blood stream, from which they are removed mainly by liver and spleen. Final distribution appears to be determined by the extent of phagocytosis in the peritoneal cavity. Many engulfed brucella are carried to the mesenteric lymph nodes. Therefore any factor enhancing phagocytosis, such as presence of peritoneal exudate, stimulation of RES or injection of brucella antiserum, will increase the radioactivity in the mesenteric nodes. Radioactivity in spleen and liver will be consequently reduced.

Several hundred antibody molecules per bacterium are sufficient to sensitize the brucella to increased phagocytosis.

The labelled brucella can be used as a sensitive indicator of inflammatory activity in the abdominal cavity.

Peery, T. M. & Belter, L. F. (1960). Brucellosis and heart disease. II. Fatal brucellosis: a review of the literature and report of new cases.—Amer. J. Path. 36, 673-697. 3516

Literature on heart disease associated with brucellosis in man is reviewed and tabulated data are presented of 44 deaths due to *Brucella abortus*, *Br. melitensis* or *Br. suis*. Endocarditis was present in 35 of the 38 with heart disease and its incidence was highest in *Br. abortus* infection.—T.E.G.R.

I. van Drimmelen, G. C. (1960). "Species" of *Brucella* characterized by phage lysis.—Bull. World Hlth Org. 23, 127-130. 3517

II. Jones, L. M. (1960). Comparison of phage typing with standard methods of species differentiation in brucellae.—Ibid. 130-133. 3518

III. Redfearn, M. S. & Berman, D. T. (1960). Application of the gel-diffusion technique for typing brucellae.—Ibid. 133-134. 3519

I. The author confirmed that brucella bacteriophage, originally isolated in Russia [Parnas *et al.* (1958)—*Nature, Lond.* 182, 1610] was able to lyse *Brucella abortus* 544 but not *Br. melitensis* 10M nor *Br. suis* 1330. A single plaque was obtained when the phage suspension was seeded on a phage resistant bovine brucella strain and this was propagated

on Strain 19 and on *Br. abortus* 544. This "variant" phage was found to be able to lyse both strains of *Br. abortus* as well as *Br. suis* 1330 and the originally phage resistant bovine brucella strain. The significance of these findings for the classification of brucella is discussed.

II. The author compared the results of phage typing (using a phage preparation originally isolated in Russia) with those obtained using the usual biochemical-serological test on 84 brucella cultures. Strains of *Br. abortus* resembling the FAO/WHO reference strain 544, aerobic *abortus*, aerobic *abortus* but somewhat thionin resistant, dye sensitive *abortus* and thionin resistant *abortus*, were lysed by the phage preparation used. Strains that were *abortus* biochemically but *melitensis* serologically were also phage susceptible but cultures that were *melitensis* biochemically but *abortus* serologically were not lysed by phage. The American and Danish varieties of *Br. suis* and *Br. neotomae* were not lysed by phage. Strains of *Br. melitensis* resembling the FAO/WHO reference strain 16M, as well as dye sensitive *melitensis*, and strains of *melitensis* cross reacting with *abortus*, isolated from cattle, sheep, goats and man, were not susceptible to phage, but strain of *melitensis* isolated from cattle in Gt. Britain were susceptible to phage lysis. These British cattle *melitensis* strains are indistinguishable from the 16M strain of *melitensis* by laboratory tests except for a greater sensitivity to thionin when incubated in air and the fact that they are phage susceptible. Strains of *melitensis* isolated from cattle from other countries, i.e. Malta, were resistant to phage.

III. Extracts for the gel diffusion technique were produced by heating the brucella cells in 1% phenol at 65°C. for 1 hour. Antisera produced in rabbits against *Brucella abortus*, *melitensis* and *suis* gave strong lines of precipitation when tested against an extract prepared from *Br. melitensis* 16M (WHO/FAO reference strain). Sera produced in cattle gave an additional precipitation line. Of 84 brucella cultures studied in this way, it was found that those cultures that would normally be agglutinated with monospecific *melitensis* serum, regardless of their other biochemical tests, gave strong precipitation lines against either *abortus*, *melitensis* or *suis* antisera but cultures agglutinated by monospecific *abortus* sera did not produce a diffusible extract and

were negative to the gel diffusion test. It was suggested that this method could be used instead of the agglutination test with monospecific sera for the identification of brucella cultures.—W. J. BRINLEY MORGAN.

I. Ringen, L. (1960). A preliminary report on a comparison of agglutination-lysis, capillary tube, and hemolytic tests for the diagnosis of bovine leptospirosis.—Proc. 63rd Meet. U.S. Livestock Sanit. Ass. San Francisco, 1959. pp. 120-125. 3520

II. Carbrey, E. A. (1960). National survey of serological techniques used for the diagnosis of leptospirosis.—Ibid. pp. 126-139. 3521

I. Serum from experimental and natural infections was used, leptospiuria being taken as indication of active infection. The agglutination-lysis (AL) test was positive within 2 weeks after infection and persisted at a diagnostic level long after recovery. The capillary tube (CT) test was positive after 4 weeks and persisted for 4 weeks but was diagnostic for at least 20 weeks in 25% of the animals. The haemolytic test (HL) was not always positive—except in leptospiuria; it became negative within 8 weeks after leptospiuria. In natural infection samples positive to the HL test were also positive to the CT and AL tests; those positive to the CT were also positive to the AL but not necessarily to the HL; those negative to the AL were also negative to the other two; and those negative to the CT were also negative to the HL, but not necessarily to the AL.

II. A questionnaire and 25 serum samples were sent to each of 73 laboratories. A high degree of systematic variation was observed among laboratories employing the techniques of: agglutination-lysis; Stoenner plate; Stoenner capillary tube; Galton plate; and microscopic agglutination with formol-treated antigen. Minimum variation was shown by laboratories using the Galton test. The standard deviation for the agglutination-lysis test was about a fivefold dilution factor and for the other tests slightly more than a twofold dilution factor. A study of the distribution of the laboratory means of each test revealed groups of laboratories whose means did not differ significantly.—T.E.G.R.

Ringen, L. M. (1960). The detection of leptospiral antigen in bovine urine by means of a hemolytic reaction (UHL).—J. Immunol. 84, 582-585. [Author's summary modified.] 3522

A haemolytic test for the detection of

leptospiral antigen in bovine urine uses a soluble erythrocyte-sensitizing substance precipitated out of bovine urine during the leptospiuria period. Results obtained from calves experimentally infected with *L. pomona* indicated that the test became positive within 3 weeks after infection. In later stages of the disease the presence of leptospiral antigen was demonstrated for at least several weeks after it could no longer be detected by inoculation of lab. animals.

Wood, G. E. & Alexander, A. D. (1960). The effect of selected antibacterial and antiprotozoal agents in treatment of leptospirosis in experimentally infected hamsters.—Antibiot. & Chemother. 10, 341-348. [Summary in Spanish pp. 388-389. Authors' summary modified.] 3523

Pentamidine, nitrofurantoin, chloroquine, arsenic and antimony dimercaptosuccinates when administered 3-4 days after infection, failed to alter the normal course of *L. canicola* infection. Kanamycin, administered 3-5 days after infection at 50 mg./kg./day, offered limited protection against death but did not arrest the carrier status of the infected animals. Oleandomycin 100 mg./kg./day, cured infected hamsters when the start of therapy was delayed up to seven days after infection in animals that would otherwise die one to two days later. Lower levels, in the order of 12.5 to 25 mg./kg./day, protected hamsters against death when given up to 4 days after infection, but leptospirae could be isolated from the kidneys. Oleandomycin may have therapeutic value in *L. canicola* infections. The oleandomycin sensitivity of other serotypes merits further attention.

Anon. (1960). Laboratory notes on the diagnosis of anaerobic bacterial diseases.—Proc. 63rd Meet. U.S. Livestock Sanit. Ass. San Francisco, 1959. pp. 408-426. 3524

Recommendations are made by the Committee on Anaerobic Bacteria for procedures to be followed in the investigation of animal diseases caused by clostridia. These cover: collection and dispatch of specimens; history of outbreak; examination of tissues; bacteriological procedures; and animal inoculation. Methods for the identification of *Cl. welchii* toxins are included.—T.E.G.R.

Tomić, L., Foršek, Z. & Romić, Ž. (1960). Studij o aktivnoj imunizaciji protiv šuštavca i parašuštavca. II. Komparativna istraživanja stvaranja imuniteta s punim, na Al (OH)₃

adsorbiranim i s Al(OH)₃, koncentriranim anavakcinama Cl. fesceri i Cl. septicum. [Active immunization against blackleg and malignant oedema. II. Concentrated and adsorbed *Clostridium chauvoei* and *Cl. septicum* vaccines.]—Vet. Arhiv 30, 49-58. [In Croat. Summaries in English and French.] 3525

This is a comparative study of the protective effect and duration of immunity produced by three types of clostridial vaccines, e.g. formolized whole culture, adsorbed aluminium hydroxide vaccine and concentrated aluminium hydroxide vaccine, prepared from *Cl. chauvoei* and *Cl. septicum* cultures. Doses of 0.5 ml. of adsorbed or concentrated vaccine of *Cl. chauvoei*, or 0.3 ml. of that of *Cl. septicum*, produced immunity which protected sheep for at least 240 days against challenge with 150 L.D. of *Cl. chauvoei*, or 160 L.D. of *Cl. septicum* culture. The effect of 0.5 ml. of adsorbed or conc. vaccine was about equal to that of 5 ml. of killed vaccine. [For part I, see *V.B.* 30, 2129].—E.G.

Izzi, R. & Tanga, G. (1959). Osservazioni su di un focolaio della così detta "cancrena alare dei polli". [Wing gangrene in fowls.]—Atti Soc. ital. Sci. vet. 13, 682-686. [Summaries in French and German.] 3526

An account is given of an outbreak of so-called "wing gangrene" in 10,000 fowls with a mortality of about 30%. *Staphylococcus pyogenes aureus* and a Gram-positive, non-motile organism resembling *Clostridium welchii* were isolated from the spleen, heart blood and exudates. Control measures consisted of hygiene and a change of diet to one with a lower protein content and no antibiotic by-products.—T.E.G.R.

Prokof'eva, M. T., Doroshko, I. N., Gurova, E. I., Zolotov, N. N. & Ignatov, V. A. (1960). [Role of deep litter in pullorum disease and tuberculosis of fowls.]—Veterinariya, Moscow 37, No. 5 pp. 28-33. [In Russian.] 3527

Five poultry houses each having 175 sq. metres floor space were used to compare deep litter made of chopped maize stalks with litter periodically changed. About 1,000 birds aged 6 months were placed in each house. In two houses birds known to be infected with pullorum disease or TB. were placed among healthy fowls: half of each house had deep litter and in the other half the litter was changed. Examination and tests for each disease were done at intervals of 2 months

for a year; results of tests are shown in tables.

There was no significant spread of either disease in the deep-litter houses. Samples of deep litter taken from a depth of 5-20 cm. were artificially infected with the causal organisms: *S. pullorum* was not recovered later than 10 days after infection, but tubercle bacilli lived for at least 5 months.—R.M.

Campion, R. L. (1959). Patogenicidad del *Bacillus anthracis* y del *Clostridium chauvoei* para el *Chaetophractus villosus* (peludo). [Susceptibility of *Chaetophractus villosus* (armadillo) to *Bacillus anthracis* and *Clostridium chauvoei*.]—Rev. Med. vet., B. Aires 40, 23-27. 3528

Anthrax bacilli provoked fatal septicaemia in the armadillo. This animal was refractory to *Cl. chauvoei*.—R.M.

v. d. Schaaf, A., van Dorssen, C. A., Donker-Voet, J., Jaartsveld, F. H. J., Frik, J. F. & Brouwers, G. W. M. van Golstein. (1960). Overzicht der onderzoeken van het uit de praktijk ingezonden ziektemateriaal over het jaar 1958. [Survey of examinations of specimens in the Institute for Bacteriology, Veterinary Faculty, Utrecht, in 1958.]—Tijdschr. Diergeneesk. 85, 337-345. [In Dutch. Summaries in English, French and German.] 3529

Among the great variety of findings were the following: results of examination of horse sera for salmonella (87 of 216 positive) and brucella (7 of 216 positive); species of streptococcus in uterine secretion from 68 mares; organisms isolated from bovine fetuses, uterine secretion and udder secretion; *Saccharomycopsis guttulata* associated with acute digestive disturbance in rabbits; pasteurella infection in cats; sensitivity to antibiotics of bacteria from dogs; *Salmonella typhi-murium* infection in g.pigs; a variety of conditions in wild and domestic birds.—R.M.

van Dorssen, C. A. (1960). Spontane en experimentele botryomycose bij het paard. [Spontaneous and experimental botryomycosis in the horse.]—Tijdschr. Diergeneesk. 85, 441-452. [In Dutch. Summaries in English, French and German.] 3530

A staphylococcus was isolated from a large tumorous mass on the hind leg of a horse. Histologically the lesion was typical botryomycosis. Attempts to reproduce the condition by applying cultures of the staphylococcus in various ways in 7 horses were successful in two cases, one where the culture was introduced into a surgical wound and

another where an emasculator was dipped in culture before being used for castration. From a study of the properties of the organism, the author concluded that it was a new species which he named *Staphylococcus ascoformans*.—R.M.

✓ Jeffery, S. M. S. & Kenzy, S. G. (1960). Nutritional factors influencing experimental *Candida albicans* infection in chickens. I. Effect of vitamin A deficiency. — Avian Diseases 4, 138-151. 3531

Experimental infection was set up in 10 of 16 chickens on a diet deficient in vitamin A; nervous symptoms and retarded growth were observed. The disease was reproduced in only one of 14 on a balanced diet. The frequency of signs of vitamin A deficiency was twice as high in infected as in non-infected birds. The fungus was demonstrable in the faeces within 11 days after the first inoculation. The yeast cells in the faeces increased threefold 2 days after the second inoculation (given 27 days after the first) but were not observed 58 days after the first inoculation, although lesions were still present. —R.M.

✓ Austwick, P. K. C. (1960). Mycotic dermatitis and the down-grading of wool. — National Sheep Breeders Association Yearbook, 1960 pp. 39-42. [Radlett, Herts: N.S.B.A.] 3532

This is an interesting account of mycotic dermatitis in Gt. Britain particularly in the years 1955-59. The economic loss caused by down-grading of wool and of skins may be very considerable in wet years. The possible relationship between the disease and "canary staining" of wool is discussed. It is not yet known precisely how the disease spreads, nor is any effective treatment available.

✓ Keep, J. M. (1960). The viability of *Microsporum canis* on isolated cat hair.—Aust. vet. J. 36, 277-278. [Author's summary modified.] 3533

Microsporum canis on hair collected from three cases of feline ringworm, which had been kept on the laboratory bench at room temperature, survived for 323 days, 315 days and 422 days respectively.

✓ Ciurea, V., Macarie, I., Paul, I. & Brînzoiu, M. (1960). Morfodinamica granulomului aspergilar. [Evolution of granulomas caused by *Aspergillus fumigatus*.]—Lucr. Stiint. Inst. Agronom. Bucuresti pp. 635-649. [In Roumanian. Summaries in French and Russian.] 3534

Tissues were examined from rabbits, rats, fowls and pigeons infected i/v or i/p. The primordial lesion consisted of hyphae surrounded by degenerating and necrotic cells. The second stage, 12–30 hours after infection, consisted of histiocytic proliferation in a lesion measuring 120 μ diam. ("pre-granuloma"). Young granulomas, 0.5 mm. diam., were formed 52–60 hours after infection.—R.M.

Till, D. H. & Palmer, F. P. (1960). A review of actinobacillosis with a study of the causal organism.—*Vet. Rec.* 72, 527–533 & 534. 3535

Of 46,000 cattle slaughtered in Birmingham in 1958, about 0.67% had actinobacillosis. 29 strains of *Actinobacillus lignieresii* were examined culturally, biochemically and serologically. There appeared to be at least 2 serological types, with the majority of strains belonging to one type. The short survival time of the organism on hay and straw (not more than 5 days) suggests that it is an obligate parasite of animals. It was not isolated from the tongue of 150 normal cattle.

—M.G.G.

Vaccari, I., Ballarini, G., Bertoni, L., Semellini, L. & Pieresca, G. (1960). Aspetti clinici delle micosi (blastomicosi, ifomicosi, aspergillosi, ecc.) in alcune specie animali. [Clinical aspects of some mycoses of animals.]—*Nuova Vet.* 36, 37–45. [Summaries in English, French and German.] 3536

Some of the clinical and laboratory aspects of mycotic diseases of domestic and wild animals are discussed, with particular reference to early diagnosis of subacute and chronic infection here referred to as "slow sepsis". Personal observations are recorded.

—T.E.G.R.

Turner, A. W. (1960). Growth-inhibition tests with *Mycoplasma mycoides* as a basis for chemotherapy and selective culture media.—*Aust. vet. J.* 36, 221–224. [Author's summary modified.] 3537

Growth-inhibition tests were carried out with the organism of bovine contagious pleuropneumonia against 40 substances. It was relatively sensitive (inhibited by 20 μ g./ml. or less) to:—streptomycin (7.8 μ g./ml.), chloramphenicol (3.9 μ g./ml.), chlortetracycline (15.6 μ g./ml.), oxytetracycline (7.8 μ g./ml.), nitrofurazone (12.5 μ g./ml.), methylene blue (7.8 μ g./ml.), 2:6 dichlorobenzenoneindophenol (3.9 μ g./ml.), basic phenylmercuric nitrate (3.9 μ g./ml.), sodium ethylmercurithiosalicylate (0.24 μ g./

ml.), sodium meta-arsenite (20 μ g./ml.), and mepacrine (15.6 μ g./ml.). Some of these substances might therefore be tried for chemotherapy. The relative insensitivity of the organism (not inhibited by 250 μ g./ml. or more) to various sulphonamides, lysozyme, cycloheximide, cyanide and azide, suggests the use of these substances in selective culture media.

Knight, G. J. (1960). Studies with avianised strains of the organisms of contagious bovine pleuropneumonia. VIII. Experiments with avianised vaccines prepared from Muguga T2/32 strain of *Mycoplasma mycoides*.—*Bull. epiz. Dis. Afr.* 8, 11–21. [Summary in French. Author's summary modified.] 3538

Laboratory trials of a moderately attenuated Muguga T2/32 strain vaccine and of an Australian type V/5 vaccine, used wet, were made. Wet V/5 and dried T2/32 vaccines were of a similar order of effectiveness and either might prove satisfactory for field use in East Africa. However, because of the advantages of a dried vaccine, experiments in drying V/5 vaccine are also reported. These proved, for the most part, disappointing, the dried V/5 being decidedly inferior to dry T2/32 vaccine.

Killed adjuvant vaccines with both T2 and V/5 strains have also been used but without success.

van Iterson, W. & Ruys, A. C. (1960). On the nature of P.P.L.O. II. Electron microscopy.—*Antonie v. Leeuwenhoek. J. Microbiol.* 26, 9–22. 3539

Electron microscopy revealed coccoid elements in PPLO of human origin. The authors suggested that PPLO were the L phase of minute coccoid bacteria.—R.M.

Contini, A. (1960). Caratteri morfologici culturali e ciclo di sviluppo dei P.P.L.O. della pleuropneumonia contagiosa degli ovini. Nota I. [Morphological and cultural characters of pleuropneumonia-like organisms from sheep. I.]—*Vet. ital.* 11, 280–292. [Summaries in English, French and German.] 3540

Annular elements of various sizes, coccoid, globular and filamentous forms were observed in infected cells and in selective media. The growth cycle of the micro-organisms was similar to that described by Wroblewski for the causal agent of contagious agalactia in selective culture media; in infected cells it appeared to start with the globular form followed by coccoid forms which in turn

developed into annular elements and punctiform bodies.—T.E.G.R.

Butler, M. & Knight, C. J. G. (1960). I. The survival of washed suspensions of mycoplasma. II. The measurement of the growth of mycoplasma in liquid media. III. Steroid growth requirements and steroid growth inhibitors of mycoplasma. — J. gen. Microbiol. 22, 470-477; 478-482 & 483-491. 3541

I. Washed pleuropneumonia-like organisms died rapidly when suspended in 0.85% (w/v) NaCl in distilled water at room temp.; addition of chelating agents, reducing agents or finely ground manganese dioxide to the suspension decreased this effect. Survival was good in a solution of potassium phosphate (K_2HPO_4 , 0.01 M adjusted to pH 7) in good quality "deionized" water at 2-4°. The quality of the water used was very important.

II. Growth was assessed by colony count, turbidity, and by measurement of dry weight, total-N and deoxyribonucleic acid (DNA) of washed deposits of centrifuged cultures. Samples from cultures were also examined by phase-contrast microscopy. The growth curves obtained by colony count resembled bacterial growth curves. The other methods were of value only when maximum growth was approached because the yield of organism per unit vol. of culture was very small. In 2 different media the growth curves obtained by the colony count were almost identical but total-N and DNA values were different.

III. In a peptone and yeast extract (PY) medium, growth of *Mycoplasma laidlawi* was not significant and death sometimes occurred; growth was good when 1% serum or 1% bovine plasma albumin was added. Cholesterol and some other steroids (at 20 µg./ml.) added to the basal PY medium stimulated growth but not to the same extent as serum or albumin. Certain other steroids were potent inhibitors of cholesterol-promoted growth at one-tenth the cholesterol concentration. One of these steroids at 2 µg./ml. inhibited the growth obtained in PY + albumin medium; this inhibition was annulled by 200 µg. cholesterol/ml. Growth of *M. laidlawi* strains A and B, *M. mycoides* var. *capri* and *M. bovis-genitalium* in a rich serum-containing medium was inhibited by 2 of the inhibitory steroids; the inhibitory effect of one of these steroids was greatly diminished if the steroid was added after growth had begun.—T.E.G.R.

Razin, S. & Knight, C. J. G. (1960). I. A partially defined medium for the growth of

mycoplasma. II. The effects of ribonucleic acid and deoxyribonucleic acid on the growth of mycoplasma.—J. gen. Microbiol. 22, 492-503 & 504-519. 3542

I. Saprophytic *Mycoplasma laidlawi* strains A and B grew less well in a partially defined medium (inorganic salts, Casamino acids, vitamins, nucleic acids, glucose and 10%, v/v, horse serum) than in the complex medium described by Edward. Known growth factors did not improve growth; yeast extract (0.05%, w/v) allowed growth equivalent to that in Edward medium. The serum could be replaced by 1% (w/v) crystallized bovine plasma albumin; suboptimal growth in this medium could not be improved by the addition of known growth factors. Riboflavin and nicotinic acid were the only vitamins essential for growth of Strain A in the albumin medium. The Casamino acids could be replaced by a mixture of known amino-acids. The pathogenic *M. mycoides* var. *capri* and *M. bovis-genitalium* grew in partially defined medium when the serum concentration was raised to 20% (v/v) and yeast extract added to a final conc. of 0.05% (w/v).

II. The saprophytic *M. laidlawi* strain A did not grow in the basal medium alone but did on addition of suitable concentrations of ribonucleic acid (RNA) and of deoxyribonucleic acid (DNA). Chemical and enzymic degradations showed that the growth-promoting effect of RNA could be brought about by a ribo-oligonucleotide but not by smaller fragments of the molecule, and the effective moiety of DNA was thymidine (thymine was less effective). The growth-inhibiting activity of RNA was abolished by degradation but that of DNA was not affected by degradation to oligonucleotides and was only partially diminished by degradation to nucleotides or nucleosides. Strain B of *M. laidlawi* grew in the basal medium when DNA alone was added; thymidine also satisfied this nutritional requirement provided some RNA was present. *M. mycoides* var. *capri* resembled *M. laidlawi* strain B in responding to DNA alone, but differed in its indifference to high DNA concentrations. Thymidine replaced DNA only to a certain extent when added together with RNA. A growth-promoting effect of DNA was also found with the L-phase of *Streptobacillus moniliformis*; thymidine then replaced DNA completely. The RNA/DNA antagonism was observed with all organisms examined. This phenomenon is discussed.—T.E.G.R.

Wilbur, R. D., Catron, D. V., Quinn, L. Y., Speer, V. C. & Hays, V. W. (1960). **Intestinal flora of the pig as influenced by diet and age.**—*J. Nutr.* 71, 168-175. [Authors' summary modified.] 3543

Influences of diet and management were studied using 48 pigs weaned at two weeks of age and fed to 6 weeks of age, at which time half of the pigs were killed and bacteriological examinations made on duodenal, ilial, caecal and rectal contents. The organisms studied were the total aerobes, total anaerobes, lactobacilli, coliforms, streptococci, staphylococci and moulds and yeasts.

All rectal organisms, except total anaerobes and lactobacilli, were lower in numbers when lactose, as compared with starch, was the carbohydrate fed. In each section of intestine coliforms, streptococci, staphylococci and moulds and yeasts were also scarcer with lactose feeding. Counts of most organisms increased sharply from the duodenum to caecum and only slightly from the caecum to rectum.

Pigs fed in groups of 6 generally had higher counts with less variation than those individually-fed. A significant difference between litters was also observed.

The intestinal tract is relatively devoid of microbial growth at birth, but within 24 hours these populations reached their greatest density of viable cells. Most of the organisms

declined in numbers from one day of age up to weaning (2 weeks of age), at which time they increased to a level just below that attained at one day of age. The counts then remained fairly stable to market weight. But coliforms seem to decline from one day of age to market weight.

Lactobacilli generally predominated, with streptococci coliforms, staphylococci and moulds and yeast usually following in that order. These relationships were influenced to a certain extent by age and also by location in specific sections of the intestine.

McKay, K. A. & Branion, H. D. (1960). **The development of resistance to terramycin by intestinal bacteria of swine.**—*Canad. vet. J.* 1, 144-149. [Summary in French.] 3544

Sixteen piglets aged 6 weeks were obtained from a farm where oxytetracycline had been used for at least a year. Faeces samples were examined for resistant bacteria on arrival and on three occasions after 6 weeks of a diet containing 20 g. of the antibiotic per ton of food. Twelve pigs from a farm where antibiotics had not been used served as untreated controls. High resistance to the antibiotic was found in bacteria of the coliaerogenes group. Sensitivity of Gram-positive bacilli was within the normal range. Concentrations of oxytetracycline in caecal contents were too small to inhibit the growth of lactobacilli.—R.M.

See also absts. 3592 (effect of *Clostridium welchii* Type C toxin on haemagglutination-inhibition of Newcastle disease virus); 3691-3692 (aetiology of porcine atrophic rhinitis); 3765 (report on animal health services, Gt. Britain); 3766 (report, Union of South Africa); 3768-3769 (reports, Tanganyika); 3770 (report, Sarawak); 3772 (report, Belgian Congo).

DISEASES CAUSED BY PROTOZOAN PARASITES

Littlejohns, I. R. (1960). **Eperythrozoonosis in sheep.**—*Aust. vet. J.* 36, 260-265. [Author's summary modified.] 3545

A disease associated with *Eperythrozoon ovis* was diagnosed in lambs aged 2-3 months in New South Wales. The parasite was recovered by animal inoculation and its effect on experimentally infected sheep examined.

The disease caused considerable mortality, and produced constant P.M. features of anaemia, enlarged soft spleen and excess pericardial fluid. Eperythrozoonosis deserves consideration in the diagnosis of anaemic conditions in sheep.

Gray, A. R. (1960). **Precipitating antibody in trypanosomiasis of cattle and other animals.**—*Nature, Lond.* 186, 1058-1059. 3546

By means of a modified double diffusion technique in agar gel, precipitating antibody was demonstrated in sera from cattle, rabbits, a horse, a duiker, and 3 of 5 human beings with trypanosomiasis. The technique of the test and of the preparation of antigens from *T. vivax*, *T. brucei* and *T. gambiense* is described. In 4 cattle infected by *Glossina morsitans* carrying a mixed infection of *T. vivax* and *T. congolense*, precipitating antibody appeared after 11-39 days of parasitaemia. In 2 treated with ethidium bromide the antibody disappeared in 28 days. In a bull with clinical *T. vivax* infection and sporadic parasitaemia antibody was demonstrated over a period of 8 months. The pattern of the precipitation reactions differed between animals. Antibodies in the serum of an

animal with a pure infection reacted to a lesser degree with antigens from several species of trypanosome.—M.G.G.

Taylor, A. E. R. (1960). **I. The absorption of Prothidium by Trypanosoma rhodesiense. II. The absorption, distribution and excretion of Prothidium in rats, rabbits and cattle.**—Brit. J. Pharmacol. 15, 230-234 & 235-242. [Author's summaries modified.] 3547

When rats, heavily infected with *T. rhodesiense* were injected with Prothidium and killed 1 to 5 hours later, measurable amounts of the drug could be extracted from the parasites: a million trypanosomes have been shown to absorb 0.01 to 0.06 µg. of Prothidium *in vivo*. When viewed with the fluorescence microscope, treated trypanosomes appeared to concentrate Prothidium particularly in the blepharoplast and other cytoplasmic granules. Prothidium was absorbed by trypanosomes *in vitro* in less than 30 min. When equilibrium had been reached the concentration of the drug inside the trypanosome was approx. 400 times the concentration outside, in the range of concentrations studied.

Prothidium was concentrated in the liver and kidneys of rats and rabbits after intraperitoneal or intracardiac injection; it was detectable in these organs for 7 days in rats and 10 days in rabbits. The drug protected adult rats against *Trypanosoma vivax* for 8 weeks. Histological examination of the organs of rats treated with Prothidium indicated that no damage had been incurred from the treatment. Cattle treated s/c had swellings at the site of injection which disappeared within 6 weeks. Excretion of unchanged Prothidium occurred in the bile in rats and the drug was detectable in the bile for 9 days, but none could be detected in faeces or urine of rats or rabbits. No metabolic products of the drug were found in the tissues or plasma of rats, rabbits, or cattle. In rat liver perfused for 6 hours with Prothidium, only the unchanged drug was recovered. A depot of the drug was formed at the site of s/c inj. in cattle and this remained for at least 3 months. Prolonged prophylactic action was probably due to the formation of this depot since Prothidium injected i/p into a calf was excreted at a similar rate to that observed in rats and rabbits.

Ruiz, A. (1959). *Eimerias* de los bovinos de Costa Rica. I. Incidencia en animales adultos y sanos. [Bovine coccidiosis in Costa Rica. I. Incidence in adult healthy animals.]—Rev.

Biol. trop., Costa Rica 7, 221-224. [English summary modified.] 3548

Faeces from 100 apparently healthy adult cattle were examined for *Eimeria* oocysts. Twelve animals were parasitized, the species and incidence being *E. bovis*, 7%; *E. ellipsoidalis*, 3%; *E. zürni*, 1%; *E. cylindrica*, 1%.

Peterson, E. H. (1960). **A study of anticoccidial drugs against experimental infections with *Eimeria tenella* and *necatrix*.**—Poult. Sci. 39, 739-745. [Author's summary modified.] 3549

Seven anticoccidial preparations were tested for activity against experimental infections due to *Eimeria tenella* and *necatrix*, with Nicarbazine as the control drug. They were classified into four groups: (1) Glycamide and Zoaline (and Nicarbazine) afforded complete or nearly complete protection against both species. (2) Polystat and Unistat were highly protective against *E. tenella*, but somewhat weaker against *E. necatrix*. (3) Arzene was highly active against *E. tenella* but only moderately active against *E. necatrix*. (4) Bifuran and Trithiadol were only moderately active against both species.

I. Dickinson, E. M., Babcock, W. E. & Kilian, J. G. (1960). **A program of immunization against avian coccidia.**—Proc. 63rd Meet. U.S. Livestock Sanit. Ass. San Francisco, 1959. pp. 223-225. 3550

II. Banskowski, R. A., Stover, D. E. & Jamison, S. L. (1960). **Coccidiosis immunization at a poultry testing project.**—Ibid. pp. 226-230. 3551

I. Field trials involving 154,315 chickens were carried out in Oregon. The immunizing suspension contained sporulated oocysts of *Eimeria tenella*, *maxima*, *acervulina*, *necatrix* and *praecox*. It was administered in the food. Its preparation was described and conditions for the establishment of satisfactory immunity were enumerated.

II. A suspension of sporulated oocysts of *Eimeria tenella*, *necatrix*, *acervulina*, *maxima* and *praecox*, prepared by the method described in the preceding paper, was administered in the food to 5,700 chicks aged 9 days. After 24 hours the birds were put on a 0.05% sulphaquinoxaline mash for 6 days. No clinical reactions occurred and there was no P.M. evidence of coccidiosis in birds that died during the growth period. When the birds in one lot were 112 days old and those in a second lot were 91 days old 50 random birds from each lot were given challenge doses of

oocysts of the 5 species of coccidia. After 4 days the dropping pans were cleaned and droppings were allowed to accumulate from the 5th to the 10th day, to determine the number of oocysts produced by the birds. All the birds were killed on the 10th day. Clinical observations and P.M. findings were taken to indicate a substantial degree of immunity to all 5 species of coccidia.—T.E.G.R.

Göksu, K. (1959). Ankara ve civarı sığırlarında theileriosis üzerinde sistematik araştırmalar. [Systematic studies on theileria infection of cattle in Ankara.]—Vet. Fak. Yayınl. No. 115 pp. 73. [In Turkish. Summary in French.] 3552

During 1955–56, in Ankara and the surrounding villages, 996 cattle were examined for blood parasites. *Theileria annulata* was present in 178, *Babesia bigemina* in six, *B. bovis*, in two, and *Th. annulata* together with *B. bigemina* in two. Highest incidence was during June and July. Of 69 infected cattle, 29 died within 4–6 weeks. Among ticks collected from animals with clinical infection were *Hyalomma* spp., *Rhipicephalus* spp. and *Boophilus* spp. This doctoral thesis gives details of the biology of the parasite, experimental infection and pathology. Examination of blood samples from 642 apparently healthy cattle from one district revealed latent infection in 281.—E.G.

Mott, L. O., Saulmon, E. E., Roby, T. O. & Martin, W. H. (1960). Field control studies on anaplasmosis. — Proc. 63rd Meet. U.S. Livestock Sanit. Ass. San Francisco, 1959. pp. 68–73. 3553

Losses from anaplasmosis of cattle in the south-eastern States of the U.S.A. have been heavy during recent years and it is considered that "biting insects" are responsible for persistent, widespread infection. Clinical diagnosis is not easy and recourse to the c.f. test is necessary. Field control measures are undertaken before the insect season when the c.f. test is applied. Non-reactors are subjected to a second test after 30–45 days. Reactors and non-reactors are kept separate during the insect season after which non-reactors are subjected to a further test to assess the degree of spread among them. Field trials were carried out in 1959 on 79 herds comprising 14,994 animals. Owing to a late start it was not possible to carry out all re-tests and segregation before the insect season. Insect control was also carried out. Overall results are considered encouraging and further trials, based

on these measures and antibiotic feeding, are advocated.—T.E.G.R.

Jíra, J. & Bozděch, V. (1960). Die Bedeutung der Komplementbindungsreaktion für die Laboratoriumsdiagnostik der Toxoplasmose. [Complement-fixation test for toxoplasmosis.] — Zbl. Bakt. I. (Orig.) 179, 262–277. [Summaries in English, French, Spanish and Russian. English summary modified.] 3554

The preparation of antigens from peritoneal exudate of mice and from chorio-allantoic membranes of chick embryos is described. The antigens are titrated using hyperimmune rat sera. The rats are repeatedly infected with peritoneal exudate of hamsters. Very high antibody titres were obtained (up to 1 : 5,120).

The titration of haemolytic amboceptor and complement was supplemented by a new series of tubes, using dilutions with a difference of 25% between each adjoining tube. Chemically preserved complement of toxoplasmosis-negative g.pigs was used.

A haemolytic system with 8 MHD and 1% of erythrocytes was used. The clinical significance of the titres obtained with human sera was discussed.

Antigens from mice and from eggs show equal results, provided that the right technique is used.

Körting, H. J. (1960). Toxoplasmose-Komplementbindungsreaktion mit ultraschallbehandelten Antigenen. [Complement-fixation test for toxoplasmosis using an antigen treated with ultrasonic waves.] — Zbl. Bakt. I. (Orig.) 179, 278–288. [Summaries in English, French, Spanish and Russian.] 3555

A concentrated antigen was obtained by exposing peritoneal exudate from infected mice to ultrasonic waves at a frequency of 800 kilocycles and field strength of 10 W/cm² for 12 min.—R.M.

Koestner, A. (1959). Neuropathology of ovine, porcine, bovine and feline toxoplasmosis.—Dissertation, Ohio pp. 138. [Abst. from Diss. Abstr. 20, 2235–2236.] 3556

Brain and spinal cord from 20 sheep, 32 pigs, 17 cattle and 11 cats with toxoplasmosis were examined histologically. The infection was congenital in 8 of the pigs, 4 of the cattle and 1 cat. Lesions were found in the c.n.s. in 15 sheep, 7 cats, 17 pigs and 8 cattle, and were therefore commonest in sheep. No predilection site for lesions or for toxoplasms was found.—R.M.

Bonaduce, A. (1960). Ricerche sull'azione della spiramicina nella toxoplasmosi sperimentale del topino bianco. [*Spiramycin in experimental toxoplasma infection in mice.*] —Boll. Soc. ital. Biol. sper. 36, 57-59. 3557
Spiramycin prolonged survival time and, in high doses, effected a clinical cure with disappearance of the parasites from the blood stream.—T.E.G.R.

Savage, A. & Isa, J. M. (1959). Note on the blood of ducks with *Leucocytozoon* disease. —Canad. J. Zool. 37, 1123-1126. 3558

A severe outbreak of *Leucocytozoon* disease in domestic ducks occurred near Winnipeg in 1958. Considerable data were accumulated including blood smears showing various degrees of infection.

Disagreement as to the types of cells carrying the mature gametocytes was apparent among some investigators thus leading to a review of available literature for comparative purposes.

The observations are presented to clarify the situation and substantiate some of the published data of other workers.

—R. V. L. WALKER.

Anon. (1960). Notes on animal diseases. III. Piroplasmosis and anaplasmosis of animals other than cattle, and trypanosomiasis of domesticated animals.—E. Afr. agric. J. 25, 147-152. 3559

A review article.—T.E.G.R.

Kulasiri, C. (1960). The specificity of the Sabin-Feldman dye test with reference to pro-

tozoal infections.—J. clin. Path. 13, 339-348. [Author's summary modified.] 3560

Infections of *Eimeria stiedae* in normal and splenectomized rabbits and of *Leishmania enriettii* in normal rabbits and g.pigs and in splenectomized rabbits did not produce dye test antibodies. G.pigs injected with *Atoxoplasma* sp. and rabbits immunized with cultures of *Crithidia fasciculata* were negative for dye-test antibodies. Mice which had been infected with *Trypanosoma cruzi* did not show dye-test antibodies. All these animals, except one g.pig infected with *Leishmania enriettii*, were negative in the complement-fixation test for toxoplasmosis using egg antigen. The findings were discussed in the light of previous reports.

Lambelin, G., Ectors, F., Van Vaerenbergh, R. & Mammerickx, M. (1960). Sensibilité du buffle d'Asie aux principales maladies à protozoaires du bétail au Congo belge. Essais expérimentaux et observations cliniques. [Susceptibility of Asian buffalo to protozoal diseases in the Congo.] —Ann. Soc. belge Méd. trop. 40, 189-197. [Summaries in English, German, Spanish and Flemish.] 3561

Asian buffaloes were highly susceptible to experimental and natural infection with *Trypanosoma vivax*. Two buffaloes infected with *Theileria parva* by means of ticks died from East Coast fever within 22 days. Two were refractory to infection with *Babesia bigemina* and one was refractory to *Anaplasma marginale*. The incubation period in 3 buffaloes infected s/c with *Tr. congolense* was longer than in 3 cattle.—M.G.G.

See also absts. 3766 (report, Union of South Africa); 3767 (report, Northern Rhodesia); 3768-3769 (reports, Tanganyika); 3770 (report, Sarawak); 3771 (report, Netherlands health service for homers).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

Palacios García, C. & Fuentes Marins, R. (1958-59). Adaptation del virus de la fiebre aftosa tipo "O" Vallée (cepa Lara) a pollos de un día de edad. III. Comunicacion.—Patogenicidad e inmunidad en la especie bovina. [Adaptation of foot and mouth disease virus to day-old chicks. III. Pathogenicity and immunity in cattle.]—Bol. Inst. Invest. vet. Caracas 10 & 11, No. 26 pp. 23-33. 3562

Attenuation of type O virus by up to 100 serial passages in day-old chicks was described.

—R.M.

Shubin, V. A. (1959). [Pathological changes

in unweaned piglets experimentally infected with foot and mouth disease.] —Trudy vsesoyuz. Inst. eksp. Vet. 22, 133-141. [In Russian.] 3563

In 8 unweaned piglets dying within 6 hours of s/c and i/m infection with a mouse-adapted strain of F. & M. disease virus, degenerative changes indicating acute viraemia were found in the cardiovascular system, skeletal musculature and brain. Histological examination revealed vesicles forming on the tongue and feet. It was suggested that the musculature of unweaned piglets infected with F. & M. disease would be a rich source of the virus.—M.G.G.

Bachrach, H. L., Patty, R. E. & Pledger, R. A. (1960). **Thermal-resistant populations of foot-and-mouth disease virus.**—Proc. Soc. exp. Biol., N. Y. 103, 540-542. 3564

When a field strain of virus, grown on tissue culture, was heated at 55°C., between 0·001-0·00001% of the virus population remained alive. By means of thermal selection a virus population was obtained of which 0·1% remained alive after heating. Such populations soon reverted to normal sensitivity to heat when cultured without exposure to heat.—R.M.

Pignatelli, P. (1960). L'uso di vaccini anti-afiosi a più valenze di virus. [**Polyvalent foot and mouth disease vaccines.**]—Zootrofologia 15, 144-146. 3565

The relative merits of mono-, bi- and trivalent foot and mouth disease vaccines are discussed. Of 2 herds of cattle vaccinated with A-O vaccine one was also treated with C vaccine. The communal watering place was contaminated by cattle infected with O virus and 25 of the 68 animals in the herd vaccinated against the 3 types developed Type O infection, while the animals in the other resisted infection.—T.E.G.R.

Verge, J., Ferrando, R., Buu-Hoi, N. P. & Dhennin, L. (1960). Note préliminaire sur la chimiothérapie expérimentale de la fièvre aphteuse. [**Experimental chemotherapy of foot and mouth disease.**]—C. R. Acad. Sci. Paris 250, 3541-3543. 3566

The best of eight compounds was 1-nitroso-2-naphthol. This appears to have been used in the form of the sodium salt of 1-nitroso-2-naphthol-3, 6-disulphonic acid (also known as "nitroso-R salt"). It suppressed the lesions of F. & M. disease when injected s/c or i/p at 15 mg./kg. body wt. 2 hours before i/d inoculation of virus into the plantar pad.—R.M.

Lyubashenko, S. Y., Tyul'panova, A. F. & Grishin, V. M. (1960). [**Aujeszky's disease in fur animals: immunization, treatment and epidemiology.**]—Veterinariya, Moscow 37, No. 4, pp. 46-51. [In Russian.] 3567

Mink, arctic foxes and silver foxes usually became infected from eating pig by-products. The authors examined 17 samples of such by-products (unspecified) fed during outbreaks and isolated two strains of highly virulent Aujeszky virus. When 10 infected foxes were placed in the same cage as 10 healthy foxes, only one of the healthy animals became

infected within 30 days. The incubation period was 2-5 days after i/m infection or 3-10 days after ingestion of virus. Passage of virus 3 or 4 times through foxes rapidly reduced its virulence.

An outbreak soon ceased after exclusion of infected meat from the diet. Hyperimmune serum did not protect fur animals. Vaccine prepared by Solomkin's method [V.B. 26, 1950] protected 75-80% of fur animals against oral infection 1-3 months later. Two injections of vaccine were given at a week's interval.—R.M.

Žuffa, A. & Škoda, R. (1960). Rast vírusu Aujeszkého choroby na tkanivových kultúrach. [**Growth of Aujeszky's virus in tissue culture.**]—Vet. Čas. 9, 65-73. [In Slovak. Summaries in English, French, German and Russian.] 3568

Growth of the virus in monolayers of chick embryo fibroblasts was equal to that in pig kidney tissue culture. Composition of the nutrient appeared to have very little effect on virus yield.—E.G.

McQueen, J. L. (1960). **Rabies diagnosis. Special application of fluorescent antibody techniques.**—Proc. 63rd Meet. U.S. Livestock Sanit. Ass. San Francisco, 1959. pp. 356-363. 3569

The fluorescent rabies antibody (FRA) test, for the detection of antigen in brain tissue of naturally infected animals is described. The test is considered a rapid, practical routine diagnostic procedure. It was in complete agreement with results of mouse inoculation tests with all of 884 specimens from 23 different species of animals. It detected antigen in all of the 82 positive specimens whereas Negri bodies were demonstrable in only 76. No false positive reactions were obtained, whereas 10 specimens from which no virus could be isolated were recorded as Negri positive. The test was as efficient as mouse inoculation for the detection of virus whereas the Negri body test was only 90·5% efficient. It may be used for differentiation of Negri bodies from inclusion bodies of other diseases which are not easily identifiable by Seller's staining technique.—T.E.G.R.

Huygelen, C. (1960). **Further observations on the pathogenesis of rabies in guinea-pigs after experimental infection with the Flury strain.**—Antonie v. Leeuwenhoek J. Microbiol. 26, 66-72. 3570

After i/m inj. the first segment of the

c.n.s. to be invaded by the virus corresponded to the site of injection. After i/v inj. there was no such correlation: after inoculation into the veins of the penis the virus first invaded the anterior part of the c.n.s.—R.M.

Humphrey, G. L., Kemp, G. E. & Wood, E. G. (1960). **A fatal case of rabies in a woman bitten by an insectivorous bat.**—*Publ. Hlth Rep.*, Wash. 75, 317-326. 3571

A woman bitten on a finger by a rabid insectivorous bat (*Lasionycteris noctivagans*) died from rabies 9 weeks later in spite of treatment (serum and 14 doses of vaccine) starting on the third day after infection.

—M.G.G.

Mayr, A. (1960). Verhalten von Hühner-, Tauben- und Kanarienvogelpocken viren im Küken nach intravenöser Impfung. [**Behaviour of the viruses of fowl, pigeon and canary pox after intravenous injection into chicks.**]—*Zbl. Bakt. I. (Orig.)* 179, 149-159. [Summaries in English, French, Spanish and Russian. English summary modified.] 3572

The viruses behaved very differently when inoculated into the superficial medial leg vein of day-old chicks. A generalized disease was produced only by fowl pox virus.

The five fowl pox strains varied greatly among themselves. These differences concerned the ability to generalize, the incubation period, and the type and severity of the generalized disease.

Inoculation of chicks permits identification of strains of low virulence and the determination of virulence of vaccine strains. Besides i/v inoculation, the intracerebral route proved to be useful for determination of virulence.

Intravenous inoculation was also useful for determining antigenicity of fowl pox vaccines. When different concentrations of virulent strains are used, a general pox disease can be produced even in older fowls, which may be used for comparing the immunogenic activity of a vaccine.

Málková, D. (1960). **The role of the lymphatic system in experimental infection with tick-borne encephalitis. I. The tick-borne encephalitis virus in the lymph and blood of experimentally infected sheep.**—*Acta virologica*, Prague 4, 233-240. [In English. Author's summary modified.] 3573

Tick-borne encephalitis virus inj. s/c is transported to blood through the lymphatic system. The lymph vessels are the main route

by which virus reaches the blood stream. No direct passage of virus from tissue into blood stream was found.

When injected into a peripheral lymph vessel in the regional area of the thoracic duct, the virus reaches the blood stream through the thoracic duct. No penetration of the blood stream by virus from lymph vessels other than the thoracic duct was observed.

The rate of absorption depends on the amount of virus administered. When administered s/c in amounts of 0.043 ml. 20% virus suspension per kg. body wt. (approx. three to four thousand million intracerebral mouse LD₅₀), the virus was detected in lymph collected from the thoracic duct an hour later.

In animals such as sheep, only slightly susceptible to peripheral infection, the virus is localised in the lymphatic organs, where it persists for only a few days after infection.

Following re-infection 7 and 12 days after primary inoculation, the virus was not demonstrated in lymph or blood, even at early intervals after infection.

Hurst, E. Weston, Melvin, P. A. & Thorp, J. M. (1960). **The influence of sex on equine encephalomyelitis in the mouse and on its treatment with mepacrine.**—*J. comp. Path.* 70, 346-360. [Authors' conclusions modified.] 3574

Adult male mice (but not g.pigs), infected with equine encephalomyelitis, are more susceptible to encephalitis and death than are adult females. At any age the greater susceptibility is associated with higher viral titres in the blood and organs.

Treatment with doses of mepacrine which only partially suppress the growth of virus accentuates the sex-difference and reveals it at an age when it is not clearly demonstrable in the untreated mouse. The difference is enhanced by additional treatment with testosterone.

The differential mortality in favour of the female was reversed by oestradiol and diminished by stilboestrol. Stilboestrol tended to reduce mortality from encephalitis and oestradiol to increase it in females and sometimes in males. Oestradiol markedly increased mortality in normal and in gonadectomized males and females. Testosterone has little effect on mortality of the untreated disease.

Testosterone may exert a slightly adverse effect on therapy with mepacrine in both sexes, and stilboestrol in the male. The latter is more definitely damaging in the female.

Oestradiol is markedly disadvantageous to therapy in intact and gonadectomized males and females. Gestyl and Pregnyl have a similar action in intact females, but not in gonadectomized females or in males.

A long-acting oestrogen, tri-*p*-anisyl-bromoethylene, had no conclusive effect on the disease or on its treatment; progesterone also was inactive. A partial "anti-oestrogen", 2,4-dinitro-4'-methyl-diphenylamine, increased mortality in the female and abolished the action of mepacrine in both sexes.

Growth curves of virus in the blood and viscera of animals treated or not with hormones and/or mepacrine showed that whereas testosterone has little effect, oestradiol and stilboestrol markedly stimulate the growth of virus in certain, but not all situations and partly overcome the suppressive action of mepacrine on viral growth. Details of their behaviour are described and discussed.

Although injections of arachis oil usually do not clearly affect mortality from equine encephalomyelitis, they go far towards counteracting the therapeutic action of mepacrine. Hormones should therefore be administered in a dispersing agent rather than in oily solution.

Huygelen, C., Thienpont, D. & Vandervelden, M. (1960). Isolation of a cytopathogenic agent from skin lesions of cattle. — *Nature* Lond. 186, 979-980. 3575

An outbreak of a disease in indigenous cattle in Ruanda-Urundi was characterized by lesions on the teats and occasionally on other parts of the body and the buccal mucosa. Five of 9 cattle inoculated in the tongue with material from 9 natural cases developed at the site of infection necrotic lesions somewhat resembling those of lumpy skin disease. The agent formed intranuclear inclusions and large syncytia when passaged in testis cells from cattle or lambs. Strong local reactions developed in rabbits, g.pigs and a calf inoculated with the virus passaged in tissue culture.—M.G.G.

Polony, R., Vrtiak, J. & Balaščák, J. (1960). Výskyt vírusov skupiny ornitóza-psitakóza-LGV (neorickettsií) pri bronchopneumóniách teliat. [Occurrence of viruses of the psittacosis-lymphogranuloma group in bronchopneumonia of calves.]—*Vet. Čas.* 9, 98-102. [In Slovak. Summaries in English, French, German and Russian.] 3576

A disease, affecting calves 2-12 months old, characterized by bronchopneumonia,

pyrexia, mild diarrhoea and loss of weight was described. Five strains of "neorickettsia" were isolated from lung, liver and spleen of three affected calves, using mice, g.pigs and chick embryos. Convalescent g.pig serum was examined with various rickettsial antigens, neorickettsial antigen obtained from the Paris Pasteur Institute and psittacosis antigen, and a common antigenic fraction with *R. conori* and psittacosis was demonstrated. Details were also given of serological findings in man and the public health implications of these findings were discussed.—E.G.

Placidi, L. (1960). Les kérato-conjonctivites infectieuses des ruminants. Reproduction expérimentale d'une kérato-conjonctivite du mouton de nature virale. [Infectious kerato-conjunctivitis of ruminants.]—*Maroc méd.* 39, 408-414. 3577

The author has observed outbreaks of kerato-conjunctivitis in sheep for several years. They are seasonal, appearing at the end of spring, and affect only about 15% of the animals. Conjunctival scrapings do not contain rickettsia or cellular inclusion bodies, the Weil-Felix test is negative, and there is no reaction to Q fever antigen. Chlortetracycline hastens recovery. Goats are unaffected. Healthy sheep developed conjunctivitis after conjunctival instillation of infected conjunctival scrapings treated with penicillin and streptomycin, but not if serum from recovered sheep was first placed in contact with the scrapings for 24 hours nor if the serum was instilled beneath the conjunctiva of the experimentally infected sheep. Mice, rabbits and chick embryos appeared to be insensitive. The agent is considered to be a virus.—M.G.G.

Hadlow, W. J. (1960). Scrapie panel.—*Proc.* 63rd Meet. U.S. Livestock Sanit. Ass. San Francisco, 1959. pp. 300-302. 3578

The syndrome produced experimentally in goats is essentially like scrapie in sheep. The main lesion in goats is widespread degeneration of nerve cells characterized by shrinkage and increased basophilia of the neurones and vacuolation of the cytoplasm of nerve cells, at all levels of the neuraxis but most conspicuous (not necessarily most severe) in the brain stem, and an increase in size and number of astrocytes. As regards the distribution of the lesions, structures in the diencephalon are the most severely affected, the various nuclei of the thalamus exhibiting the most consistent and severe lesions; thalamic nuclei forming

part of the visual system are commonly affected, accounting for impairment of vision. The subthalamus nucleus, presumably of functional significance in goats and sheep, and structures in the mid-brain and cerebellum (cortex and cerebellar nuclei) accounting for tremor may also be affected.—T.E.G.R.

Schwarte, L. H. (1960). **Our present knowledge of reservoirs and vectors of hog cholera virus.**—Proc. 63rd Meet. U.S. Livestock Sanit. Ass. San Francisco, 1959, pp. 317-322. 3579

Insects, parasites, infected meat and meat products, food, buildings, vehicles and man have been incriminated in the spread of swine fever. The virus persists in preserved and smoked pork and in carcasses for months in the cooler weather; it is destroyed by putrefaction. It is considered possible that parasites may act as intermediate hosts and a raccoon is stated to have acted as reservoir. There is some evidence that the virus may exist in a masked or inactive form and assume pathogenicity under certain conditions. Some problems, mainly immunological, still await solution and the need for further research is emphasized in view of the variations in the characteristics of the different strains of the virus.—T.E.G.R.

Goret, P. & Girard, M. (1959). Sur l'immunisation du porc contre la peste porcine par la souche SFA (Hudson) du virus suipéste lapinisé. Emploi du virus vaccin seul dans les conditions de la pratique. [**Immunization against swine fever with strain SFA of lapinized virus: field trials.**]—Bull. Acad. vét. Fr. 32, 649-655. 3580

Under laboratory conditions good results were obtained with strains SFA and SFA 425; in the field they caused violent reactions and even death. It is concluded that until a harmless strain of virus is obtained this vaccine, without the simultaneous use of serum, will have only a limited application. It is considered that a safe strain will be obtained after further passage in rabbits.—T.E.G.R.

Fontaine, M., Goret, P., Brion, A., Pilet, C., Girard, M. & Allou, P. (1959). Nouvelles recherches expérimentales sur la pneumonie à virus du porc. [**Further studies on virus pneumonia of pigs.**]—Bull. Acad. vét. Fr. 32, 675-694. 3581

In affected pigs the virus was present in lung tissue (with or without gross lesions) and in lymph nodes. Experimental transmission was achieved in pigs by the respiratory and

i/p routes; it was not achieved in mice by the nasal or s/c route; infection by the nasal route in rabbits caused lung lesions which were difficult to interpret. Intestinal and respiratory lesions were set up in ferrets infected by the nasal route but transmission from ferrets to other ferrets or pigs was not achieved. Studies also included: factors influencing the development of symptoms and lesions; changes in elements and chemical composition of the blood; and serological diagnosis.—T.E.G.R.

Romváry, J. & Csontos, J. (1960). Adatok a sertés vírusos eredetű hurutos, hurutos-gennyes tüdőgyulladásához. [**Actiology of catarrhal and purulent virus pneumonia in pigs.**]—Mag. állator. Lapja 15, 210-214. [In Hungarian. Summaries in English and Russian.] 3582

The authors studied the lungs of slaughtered pigs, which had been affected with respiratory conditions. From subacute cases a virus was isolated together with a wide variety of staphylococci, pasteurella, salmonella, haemophilus, *Corynebacterium pyogenes* and *Escherichia coli* in the more advanced cases. The virus was successfully propagated in 6 to 7-day-old chick embryos, and caused their death; it did not agglutinate the r.b.c. of hens, was susceptible to the broad spectrum antibiotics and caused lesions with mononuclear cell infiltration in the lungs of artificially infected pigs.

On several farms a more acute respiratory disease was observed, the symptoms and P.M. lesions of which are described. From lungs affected with this condition another type of virus was isolated which was also successfully propagated in 13-day-old chick embryos and caused their death, and agglutinated the r.b.c. of hens, which agglutination could be inhibited by immune serum against type A human influenza virus (PR8), suggesting the presence of an identical antigen in the two viruses. Infection with the virus caused a temperature rise in ferrets and mild lung lesions in mice. Of 13 weanling piglets exposed to infection by various methods, 11 developed fever and various degrees of clinical symptoms; the virus was recovered from the lung lesions of 8, all infected *via* the trachea.

From the brain of pigs from one farm the virus of Aujeszky's disease was isolated.

The role of mismanagement and under-feeding as predisposing factors contributing to the pathogenicity of these viruses is discussed; good hygiene and the avoidance of

the introduction of carriers are suggested as preventive measures.—A. SEBESTENY.

Englert, H. K. (1960). Done'sche Einschlusskörperchen beim Schwein, enzootische Pneumonie der Schweine und Schnüffelkrankheit. [Inclusion bodies in the nasal mucosa of pigs with rhinitis and pigs with endemic pneumonia.] — Dtsch. tierärztl. Wschr. 67, 401-402. [Summary in English.] 3583

Inclusion bodies similar to those described by Done [V.B. 29, 1783] were found in histological sections of the nose of pigs with rhinitis in the Freiburg area and also in piglets with endemic pneumonia, aged 3-7 weeks and on 3 different farms.—R.M.

Mornet, P., Goret, P. & Gilbert, Y. (1959). Immunité croisée entre la maladie de Carré et la peste bovine. [Cross immunity between canine distemper and rinderpest.] — Bull. epiz. Dis. Afr. 7, 255-263. [In French. Summary in English.] 3584

Cross immunity reactions between canine distemper and rinderpest were studied using ferrets and cattle.

Both lapinized and virulent rinderpest virus gave rise to a high grade immunity to distemper. In all, on challenge with virulent distemper virus, 5 out of 24 ferrets died, the survivors showing no clinical reaction. Rinderpest hyperimmune serum neutralized avianized distemper virus both in eggs and in ferrets.

Virulent distemper virus protected cattle against challenge with rinderpest virus but avianized distemper virus produced irregular results.—J. H. DARBYSHIRE.

Anon. (1960). Measles and distemper.—Brit. med. J. July 23rd, 284-285. 3585

Black (1959) reported measles antibody in 12 of 37 human beings with no history of measles. It is suggested that infection with an antigenically related virus such as that of distemper might have been the cause, and that minor respiratory illness, non-bacterial pneumonitis and giant-cell pneumonia in man might be due to such infection.—M.G.G.

Pepevnak, F. L., Taylor, P. A. & Walker, V. C. R. (1960). Infectious canine hepatitis modified live virus vaccine produced in ferret kidney cells. — Canad. vet. J. 1, 186-193. [Summary in French. Authors' summary modified.] 3586

Canine hepatitis virus passaged in pig and ferret kidney cells induced specific antibodies in susceptible dogs. Dogs inoculated with

such modified virus did not show any abnormalities and for as long as 11 months there was no spread of the modified virus to litter-mates.

A single inoculation of the modified virus into susceptible puppies gives immunity for more than a year.

Although as little as 5 TCID₅₀ of modified virus can produce antibodies, a larger dose should be used for vaccination.

The virus was also propagated in g-pig or hamster kidney and pig lung cells.

Schindler, R. & Mohr, W. (1959). Über eine Infektion mit dem Virus der Hepatitis contagiosa canis beim Menschen. [Infection in man with canine hepatitis virus.] — Dtsch. med. Wschr. 84, 2080-2084. 3587

At the Bernhard Nocht Institute in Hamburg 1,398 human sera were tested for antibodies to canine virus hepatitis by the c.f. test and one gave a weakly-positive reaction while another was strongly positive. The latter sample came from a girl aged 14 with an illness characterized by skin rash, enlarged lymph nodes, conjunctivitis, rhinitis, haemorrhages on the soft palate. The c.f. test for canine virus hepatitis was repeated after a week and was still positive (1:40). Tests for influenza and adenovirus were negative. The illness subsided after 16 days. Five months after recovery the c.f. test for hepatitis was positive at 1:10. There was a dog in the patient's house.—R.M.

Reculard, P., Vallée, A., Le Cain, A., Virat, B. & Levaditi, J. (1959). Etude d'une pneumopathie à virus du chien. [Virus pneumonia in dogs.]—Bull. Acad. vét. Fr. 32, 603-617. 3588

A young dog that had been in contact with a dog with pneumonia was treated with distemper immune serum but developed bronchopneumonia, hepatitis, nephritis, myocarditis and nervous symptoms and died in a week. The liver, spleen and lungs were negative culturally and microscopically. Transmission was achieved in dogs (but not in cats, ferrets, g-pigs, mice, rabbits) by intraperitoneal and by intratracheal injection of suspension and of filtrate of spleen and of lungs, and by direct contact of infected and healthy dogs. Young dogs were more susceptible than adults. The period of incubation was 8-10 days and symptoms were dullness, inappetence, fever, oculo-nasal catarrh, purulent conjunctivitis and keratitis. The disease assumed one of two forms: (i) pre-

dominantly pulmonary (with or without nervous complications), (ii) nervous. Macroscopic and microscopic lesions are described. The causal virus was always present in the spleen; in the pulmonary form, it was present in the lungs and liver; and in the nervous form in the brain and spinal cord. It differed immunologically and culturally from the viruses of distemper, hepatitis and rhinospillitis.—T.E.G.R.

Pridham, T. J. & Wills, C. G. (1960). **Variations in the effectiveness of commercial infectious feline enteritis vaccines in preventing virus enteritis of mink.**—*Canad. vet. J.* 1, 51-57. 3589

Saline suspensions of formolized tissues from infected cats generally protected young mink from challenge after 2, 3, 4 and 6 weeks, but a vaccine containing an oily adjuvant failed to protect when given s/c or i/p.—R.M.

I. Magrassi, F., Altucci, P., Buonanno, G. A., Lorenzutti, G., Sapio, U. & Margherita, G. (1960). **Nuovo isolamento di un virus epatico nel topo (virus EDP). Sue caratteristiche biologiche e virologiche. [Characteristics of "EDP" virus isolated from mice with hepatitis.]**—*Boll. Soc. ital. Biol. sper.* 36, 25-29. 3590

II. Altucci, P., Buonanno, G. A., Lorenzutti, G., Sapio, U. & Margherita, G. (1960). **Caratteristiche istologiche dell'infezione sostenuta dal virus EDP nel topo. [Histological lesions caused by "EDP" virus in mice.]**—*Ibid.* 30-32. 3591

I. Heavy mortality occurred in mice used for studies on chemotherapeutic agents against viruses, particularly poliomyelitis virus injected i/p. Symptoms and lesions were not those usually caused by the virus and the main P.M. finding was intense hepatitis. A virus was isolated and the disease was reproduced in mice, symptoms appearing after 3-6 days according to the dose and route of administration. There was a drop in temperature, progressive weight loss, icteric urine, diarrhoea and slight ascites and, in the final stages, muscular tremors, spasms and paralysis. The course was 4-7 days in acute and 12-13 days in less acute infection. P.M. findings were: enlarged, pale, soft, friable liver with red-brown (occasionally yellow) spots, some enlargement of the spleen and ascites, meningoencephalitis and interstitial pneumonia. The virus differs immunologically and in other respects from that of murine hepatitis. Recovered animals are immune.

II. Lesions in the liver were first observed 24 hours after i/p inoculation and consisted of progressive degeneration with necrosis of the cells followed by intense cellular hyperplasia of the monocyte-histoid type. Concurrently with changes in staining reactions in the cytoplasm there was intense vacuolation and granular fragmentation, 48 hours after infection when cellular hyperplasia, isolated nodular or perivascular infiltration were also observed; the nuclei showed chromatin fragmentation and karyorrhexis. The final stage, 96-120 hours after infection, was characterized by the appearance of necrotic centres, complete loss of cell outline, hyaline homogenization of the cytoplasm and disappearance of the nuclei. These lesions and pathological processes are compared with those in other types of hepatitis. Lesions in the spleen, brain and lungs are also described.

—T.E.G.R.

Quesada, A. & Calaprice, A. (1960). **Indagini sull'azione svolta dalla tossina del W. perfringens di tipo C sull'inibitore aspecifico dell'emoagglutinina del virus di Newcastle. [Effect of the toxin of Clostridium welchii Type C on non-specific haemagglutination inhibition of Newcastle disease virus.]**—*Zooflora* 15, 103-121. 3592

A detailed account of work already published [see *V.B.* 28, 3971].—T.E.G.R.

Taylor, J. R. E. & Schelling, E. P. (1960). **The distribution of avian encephalomyelitis in North America as indicated by an immunity test.**—*Avian Diseases* 4, 122-132. 3593

An immunity test, based on failure of avian encephalomyelitis virus to grow on embryos produced by immune hens, is described. Tests on embryos from 2,162 flocks from 46 States and provinces indicated a widespread incidence of the disease in the U.S.A. and Canada. There was an increase of resistant flocks from 56.8% at 5 months to 95.7% at 13-18 months. The test is recommended for the selection of resistant breeding stock.—T.E.G.R.

Hoekstra, J. & Rispen, B. (1960). **Infectieuze bronchitis bij pluimvee. III. [Infectious bronchitis in poultry. III.]**—*Tijdschr. Diergeneesk.* 85, 398-403. [In Dutch. Summaries in English, French and German. For Parts I & II see *V.B.* 30, 1844-5.] 3594

A strain that had undergone 52 egg-passages was still too virulent for field use. The authors submitted it to a further 68 egg-

passages (total 120). A concentration of 10,000 minimum egg-infective doses in each ml. of drinking water resulted in lung lesions in only one of 54 chicks aged 6-10 days, killed after 3 weeks, whereas virus of the 52nd passage caused lesions in 4 of 25 chicks. Immunity was tested by formation of neutralizing antibodies 3-4 and 7-8 weeks after administration and by challenge after 4 weeks. 52 of 60 birds resisted challenge compared with 19 of 69 unvaccinated controls.

—R.M.

Subramanyam, P. & Pomeroy, B. S. (1960). **Studies on the Fahey-Crawley virus.**—*Avian Diseases* 4, 165-175. 3595

The virus isolated from chronic respiratory disease by Fahey & Crawley [*V.B.* 24, 2367] caused only a mild nasal discharge when inoculated into the trachea of day-old and 3-week-old chickens but no symptoms in 6-week-old birds. It could be isolated for up to 10 days from day-old chicks but only for up to 3 days from the older birds. In turkey poult respiratory symptoms were probably due to a latent PPLO infection activated by the virus. Specific focal liver necrosis was a common finding in chick embryos. The pathogenicity of the virus and its role in chronic respiratory disease of chickens and infectious sinusitis of turkeys are discussed.—T.E.G.R.

Pulsford, M. F. (1960). **The growth of three strains of infectious laryngotracheitis virus of fowls in tissue culture.**—*Aust. J. exp. Biol. med. Sci.* 38, 153-162. [Author's summary modified.] 3596

The growth of a virulent epidemic type of the virus, fully adapted to tissue culture is described. It has not been possible to demonstrate a one-step type of growth, but it is apparent that the eclipse phase of this virus is relatively long, of the order of 18 hours, and is followed by rapid production and release of virus.

A prolonged lag phase is noted in the one strain of low virulence examined. This is in keeping with the growth of such strains, as described by other workers.

Subramanyam, P. (1959). **The isolation and characterization of two isolates of a previously unrecognized enterovirus of chickens.**—Dissertation, Minnesota pp. 191. [Abst. from *Diss. Abstr.* 20, 1971-1972.] 3597

Two apparently identical viruses, unrelated to other common avian viruses, were isolated by inoculating into chick embryos, or

chick-embryo kidney cell cultures, suspensions of the "caecal tonsils" from 123 birds of 27 flocks. They caused proliferative and degenerative changes in the embryos and were serially passaged by yolk-sac inoculation; they damaged cultured kidney cells. Given by mouth to chicks the viruses multiplied rapidly in the intestines during the first week, but failed to multiply in the lungs when inoculated into the trachea. Rabbits, g.pigs and mice were insensitive to infection.—R.M.

Pini, A. & Gambino, O. (1959). Prime esperienze di marcatura del virus dell'epatite infettiva degli anatrocchi col fosforo 32. [**Labelling duck hepatitis virus with phosphorus 32.**] — *Atti Soc. ital. Sci. vet.* 13, 513-517. [Summaries in English and French.] 3598

Labelling of the virus with P^{32} was achieved by inoculation of $Na_3 PO_4$ soln. into the allantoic cavity of embryonated eggs. The technique used is described.—T.E.G.R.

Gordon, F. B., Bloom, H. H. & Mamay, H. K. (1960). **Studies with drug-resistant strains of psittacosis virus. I. Comparison of four strains used in mixed cultures.** — *Virology* 11, 474-485. [Abst. from authors' summary.] 3599

Three drug-resistant strains of psittacosis virus (Sa-r, sulphonamide-resistant; SaP-r, sulphonamide- and penicillin-resistant; Cte-r, chlortetracycline-resistant) and one drug-susceptible strain (6BC) were re-examined for drug resistance in chick embryo infections.

Each drug-resistance manifested itself in a manner somewhat different from the others. These differences are described.

The limiting lethal dose of psittacosis virus for the chick embryo was identical with the limiting infective dose, thus providing evidence that clones can be derived from appropriate harvests at the limiting dilution as determined by embryo deaths.

Deinhardt, F. & Henle, G. (1960). **Interference between polyoma and vesicular stomatitis viruses in tissue culture.** — *J. Immunol.* 84, 608-614. [Authors' summary modified.] 3600

Following infection with polyoma virus cultures of mouse embryo cells acquire resistance to the virus of vesicular stomatitis just before or at the time haemagglutinins become detectable but well in advance of cytopathic effects. Propagation of the challenge virus may be completely prevented but the polyoma virus is not affected by the super-

infection. Interference with stomatitis virus is established in from 2 days to more than 10 days depending upon the dose of polyoma virus initially inoculated.

Rice, C. E. (1960). **The use of the complement-fixation test in the study and diagnosis of viral diseases in man and animals—A review.**—*Canad. J. comp. Med.* 24, 126-130. 3601

This is the first part of a review, further sections of which are to include an extensive study of available literature referring to the use of the complement-fixation test in the known groups of virus diseases.

The introduction in Part I briefly describes the more widely used methods of preparing antigens and antisera, presents a limited outline of the principal complement-fixation techniques utilized, and discusses very briefly some of the difficulties experienced with sera of certain animal species.

—R. V. L. WALKER.

Papp, K. (1959). **The eye as the portal of entry of infections.**—*Bull. Hyg. Lond.* 34, 969-971. 3602

An account of experiments undertaken to prove that measles, mumps and rubella are transmitted *via* the conjunctiva. It is stated

See also absts. 3766 (report, Union of South Africa); 3767 (report, Northern Rhodesia); 3768-3769 (reports, Tanganyika); 3770 (report, Sarawak); 3771 (report, Netherlands health service for homers); 3772 (report, Belgian Congo).

that instillation of the appropriate antisera into the eye of a susceptible individual within 15 hours after exposure will prevent infection.

—W. E. PARISH.

Kline, L. B. & Hull, R. N. (1960). **The virucidal properties of peracetic acid.**—*Amer. J. clin. Path.* 33, 30-33. [Interlingua summary.] 3603

Peracetic acid was active against a broad spectrum of viruses most of which were inactivated in 5 min. by a final conc. of 0.025 M. Its use is recommended for persons handling infectious agents and for the maintenance of aseptic conditions in laboratories and hospitals.

—T.E.G.R.

Fish, N. A. & Labzoffsky, N. A. (1960). **The incidence of Q fever among dairy herds in Western Ontario.**—*Canad. J. publ. Hlth* 51, 200-205. [Summary in French.] 3604

Bulked milk from 200 herds was examined by the capillary agglutination test, and samples from 14 herds gave positive results. 60 of the 334 cattle in the 14 herds gave positive tests on milk and blood. The number of infected animals in each herd ranged from 1 to 8.—R.M.

IMMUNITY

Brown, H. (1959). **Colostrum-acquired immunity and active antibody production in baby pigs.**—Dissertation, Iowa pp. 124. [Abst. from Diss. Abstr. 20, 1930-1931.] 3605

Serum antibodies were determined at intervals for 6 weeks after birth in piglets born to sows hyperimmunized against *Serratia marcescens* or against *Escherichia coli* combined with *Candida albicans*. Zymosan, injected i/p at 5 mg./kg. body wt., did not influence serum antibodies but it did improve growth and feed utilization. Zymosan protected pigs aged 3-4 weeks from infection with *E. coli* Strain RB4 when it was injected 24 hours beforehand.—R.M.

Siller, W. G. (1960). **Experimental allergic encephalomyelitis in the fowl.**—*J. Path. Bact.* 80, 43-53. [Author's summary modified.] 3606

Experimental allergic encephalomyelitis (EAE) has been produced in the fowl by i/m

inj. of homologous spinal cord tissue and Freund's adjuvant. The histological lesions, consisting of perivascular lymphocytic cuffing and glial proliferation, were prominent in the spinal cord and less pronounced in the brain. Peripheral nerve lesions consisting of lymphocytic infiltration were insignificant. Similar lesions were produced by seven repeated injections of homologous spinal cord alone, without adjuvant. Peripheral nerve homogenate with adjuvant produced comparatively negligible lesions. Neither demyelination nor clinical paralysis was typical for EAE in the fowl, although they did occur in one bird.

The pathological and clinical findings in EAE were compared with those of fowl paralysis.

Torlone, V., Valdina, G. & Di Antonio, E. (1959). **Inattivazione da effetto fotodinamico del fattore permeabilizzante del siero normale di ovino. [Effect of light on the permeability factor in sheep serum.]**—*Atti Soc. ital. Sci.*

vet. 13, 404-408. [Summaries in English and French.] 3607

Vascular changes occurred in rabbits at the site of i/d inj. of normal fresh sheep serum. The changes were detected by prior i/v inj. of the dye "Pontamine sky blue".

See also absts. 3456 (antibiotic-treated mastitis vaccine); 3461 (anthrax); 3468 & 3472-3475 (TB.); 3476 (John's disease); 3487 (Past. pestis vaccine); 3499 (modified c.f. test for turkey salmonellosis); 3503-3519 (brucellosis); 3520-3522 (leptospirosis); 3525 (clostridial vaccines); 3546 (precipitating antibodies in animal trypanosomiasis); 3550-3551 (avian coccidiosis); 3554-3555 (c.f. test for toxoplasmosis); 3562-3565 (F. & M. disease); 3567-3568 (Anulosis disease); 3569-3570 (rabies); 3572 (pox disease); 3580 (swine fever); 3584 (cross-immunity between distemper and rinderpest); 3586 (canine virus hepatitis vaccine); 3589 (feline enteritis vaccine against mink enteritis); 3592 (effect of clostridial toxin on haemagglutination-inhibition of Newcastle disease virus); 3593 (avian encephalomyelitis); 3601 (c.f. test for virus diseases in man and animals); 3639 (allergic test for ovine dictyocaulosis).

PARASITES IN RELATION TO DISEASE [GENERAL]

Mimioğlu, M., Güralp, N. & Sayın, F. (1960). Ankara köpeklerinde görülen parazit türleri ve bunların yayılış nisbeti. [Parasites of dogs in Ankara, and their distribution.] — Vet. Fak. Derg. 6, Nos. 1-2 pp. 53-68. [In Turkish. Summary in English.] 3608

Of 50 dogs examined in Ankara, 39 harboured parasites. Three had coccidiosis (*Isospora bigemina*, *I. rivolta* and *Eimeria*

Histologically there was acute exudative inflammation. The responsible agent was considered similar to the "native" factor in the serum of various animals. The factor was inactivated by light.—T.E.G.R.

canis), 36 were infested with helminths (*Heterophyes heterophyes*, *Dipylidium caninum*, *Taenia serialis*, *T. pisiformis*, *T. hydatigena*, *Joyeuxiella pasqualei*, *Echinococcus granulosus*, *Mesocostoides lineatus*, *Toxascaris leonina*, *Toxocara canis*, *Uncinaria stenocephala*, *Trichuris vulpis*), and four with arthropods (*Demodex folliculorum*, *Sarcoptes scabiei*, *Linguatula serrata*).—E.G.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

Sayın, F. (1960). Ankara ve civarı sığırlarında bulunan Anoplura ve Mallophaga'lar üzerinde sistematik araştırmalar. [Systematic investigations on Anaplura and Mallophaga on cattle around Ankara.]—Vet. Fak. Yayınl. No. 118 pp. 112. [In Turkish. Summary in English.] 3609

Of 1,022 cattle examined in Ankara during 1956-57, 402 were infested with *Damalinea bovis*, *Linognathus vituli*, *Solenopotes capillatus*, *Haematopinus eurysternus*, *H. tuberculatus* and *Eomenacanthus stramineus*. The number of lice found was low in summer, but increased in autumn, reaching a peak in winter or early spring. *D. bovis*, *L. vituli* and *S. capillatus* were more common in youngstock than in older animals. This doctoral thesis gives 46 illustrations of these parasites and their predilection sites.—E.G.

Stockdale, H. J. & Raun, E. S. (1960). Economic importance of the chicken body louse.—J. econ. Ent. 53, 421-423. 3610

11 clean and 11 infested pens, each with 5 birds, were maintained for 16 weeks. There was no significant difference in egg production, fertility or hatchability between clean birds and those infested with *Menacanthus* (= *Eomenacanthus*) *stramineus*. Birds in 5

infested and 5 clean pens were kept for a further 6 weeks on protein-deficient feed (12% instead of 16% protein content); this did not affect egg production. Removal of lice from the infested birds (2% pyrethrum dust) also had no effect on egg production.

Two adult lice were placed on each of 192 five-day-old broilers and allowed to breed for 8 weeks. There was no difference in weight gain, feed conversion or body wt. between these birds and a flock of 192 uninfested birds.—W. N. BEESLEY.

Hart, R. J. (1960). Susceptibility of *Lucilia cuprina* Wied. to some organic phosphorus compounds. — J. Aust. Inst. agric. Sci. 26, 70-71. 3611

The lethal dose and the slope of the dosage mortality line for malathion, diazinon, parathion, Trolene (ronnel) and Rogor (dimethoate) were determined by topical application of these insecticides to female *L. cuprina* of a susceptible laboratory strain. The insecticides are listed in order of increasing toxicity.—N. P. H. GRAHAM.

Wolfe, L. S. (1959). Observations on the histopathological changes caused by the larvae of *Hypoderma bovis* (L.) and *Hypoderma lineatum* (De Vill.) (Diptera: Oestridae) in

tissues of cattle.—Canad. J. Anim. Sci. 39, 145-157. 3612

The histology of lesions caused by larvae of *H. bovis* and *H. lineatum* is described in detail with two pages of illustrations. The descriptions cover the lesions caused by the migrating larvae and local tissue changes through to the healing process and reaction to the dead larvae.

W. reviewed the literature.

—R. V. L. WALKER.

Rich, G. B. (1960). Free-choice feeding of Trolene for reduction of cattle warble infestations (Oestridae: Diptera).—Canad. J. Anim. Sci. 40, 30-34. [Author's abstr. modified.] 3613

The systemic insecticide Trolene (ronnel) reduced the numbers of warbles by 83-95% when total doses of 180 and 250 mg. per kg. body wt. were fed to calves in supplementary feed at daily doses of 10 and 15 mg. per kg. These reductions were greater than those produced by lower daily or total doses including Trolene boluses at 105 mg. per kg. However, very high grub infestations survived in individual animals in all test groups except the two highest dosage groups. This is attributed to variation in feeding behaviour that resulted in the slower feeding animals receiving low doses of insecticide. This factor is apparently an inherent flaw in treatments based on free-choice feeding.

Grubs were not eradicated by any of the test treatments and only the 250 mg. per kg. total dosage reduced them below the level of infestation annually observed in two semi-isolated, untreated herds. Studies of the significance of this level of survival in the perpetuation of the treated infestations are necessary.

Transitory toxicity-symptoms were observed in the bolus-treated calves but not in the feed-treated calves.

Rich, G. B. & Ireland, H. R. (1959). Studies of bolus and feed formulations of two systemic insecticides for reduction of cattle warble infestations, (Oestridae: Diptera), in British Columbia, 1957-1958. —Canad. J. Anim. Sci. 39, 157-175. 3614

Ronnel (Trolene) given as a bolus at 75 and 110 mg./kg. body wt, and nellite (Narlene) at 15 mg./kg. greatly reduced the incidence of warble-fly larvae in treated cattle. Similar results were achieved with 8 and 10 mg./kg. ronnel given in the food daily

for 25 days, or nellite at 1 mg./kg. in the food. Treatment of infested yearling steers did not improve weight gain during 22 weeks after treatment. Ronnel therapy did not aggravate active coccidiosis and the coccidiosis did not impair the action of ronnel against warbles.—R. V. L. WALKER.

Kamarli, A. P. & Filatov, I. P. (1960). [Hypoderma silenus infestation in goats.]—Veterinariya, Moscow 37, No. 3 p. 65. [In Russian.] 3615

It was stated that this warble fly caused considerable economic losses in Kirgizia. Some details of the life-cycle were given. 3,550 goats were treated with a single application of 1-2% oily soln. of DDT or BHC with good results.—R.M.

Davies, J. B. (1960). Use of dieldrin in the control of *Glossina palpalis* (R-D) in Nigeria. —Nature, Lond. 187, 84-85. 3616

Control of *G. tachinoides* in N. Nigeria by a single application of 5% D.D.T. is often a routine measure, but in the wetter south 5% D.D.T. (even with five fortnightly treatments) gives little or only moderate control of tsetse. A dieldrin water-miscible concentrate diluted from 20% to 4% was sprayed by hand on all tree trunks and foliage up to 4 feet above the ground in an area of dense riverine vegetation. Tsetse numbers fell immediately and none were seen for at least a further 12 months.

The cost of treating 4½ miles of river was £41 per mile, compared with £50 per mile for D.D.T. treatment (requiring 5 applications), and £100-£200 per mile for partial hand clearing of vegetation.—W. N. BEESLEY.

Burch, G. R. (1960). Preliminary studies with Ectoral for control of ectoparasites in small animals.—Allied Vet. 31, 69-72. [Author's summary modified.] 3617

Three methods of treatment, oral, topical, and a combination of both, were used in a study of the efficacy of ronnel (Ectoral or Dow ET-57) on tick, flea, and louse, and demodectic, sarcoptic and ear mite infestations in 1,185 dogs and cats. Oral therapy alone (basic dose 50 mg./lb. body wt.) was apparently 86% effective for ticks, 81% effective for fleas, completely effective for lice, 69% effective for demodectic mange, and completely effective for ear mites. Side effects (chiefly emesis) were slight. Topical applications of fresh 0.25 to 1% soln. to the entire body or to the affected areas were completely effective

for ticks, fleas, sarcoptic mange, and ear mites. In demodectic mange, topical application was effective in 65 of 80 dogs, oral administration in 149 of 217 dogs, and combined oral and topical treatment in 341 of 425 dogs. Clinical

See also absts. 3573 (tick-borne encephalitis); 3766 (report, Union of South Africa); 3767 (report, Northern Rhodesia).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

Vodrážka, J. (1960). Pôsobenie dipterexu na fasciolu in vitro a jeho preskúšanie u invadovaných oviec za použitia kritického testu. [Action of Dipterex on *Fasciola hepatica*.] —Vet. Čas. 9, 135-142. [In Slovak. Summaries in English, French, German and Russian.] 3618

Dipterex ("Neguvon"), in vitro, in conc. up to 1:500,000, paralysed *F. hepatica*, whereas i/v or i/m doses of 20 mg./kg. body wt., given to sheep, had no therapeutic effect. —E.G.

Lämmli, G. (1960). Chemotherapeutische Untersuchungen mit Hetol, einem neuen, hochwirksamen Leberegelmittel. [Chemotherapy of liver fluke infestation with "Hetol", bis(trichloromethyl)benzene.] —Dtsch. tierärztl. Wschr. 67, 408-413. [Summary in English.] 3619

The drug described as 1,4 bis (trichloromethyl) benzene was one of a series of chlorinated xylol derivatives tested for activity against liver flukes in lab. animals, sheep and cattle. Being insoluble in water, it was given by mouth as a suspension. Single doses averaging 150 mg./kg. body wt. were given to 890 sheep and 125-135 mg./kg. to 70 cattle. Details are shown of egg counts 7, 14, 21 and 28 days after treatment of 30 animals. Negative counts were obtained 14 days after treatment in 8 of 15 sheep which beforehand were excreting 80-800 eggs per g., and at 21 days in 5 of 15 cattle. The remaining 7 of the 15 treated sheep did not show a lasting fall in egg count, but only 2 of the cattle failed to respond to treatment. Sheep tolerated up to ten times the therapeutic dose and cattle tolerated three times the therapeutic dose. —R.M.

Demidov, N. V. (1959). [Large-scale trials with difluortetrachlorethane (Freon 112) for liver fluke in sheep.]—Trudy gel'mint. Lab. 9, 89-90. [In Russian.] 3620

Following tests of this drug on cattle [V.B. 30, 462] D. tried it on 1,120 sheep. A survey had shown that between 17 and 48%

evidence indicates that treatment for demodectic mange should be given for at least one month to prevent relapse. Toxic reactions from overdosage should be treated with atropine.

were infested with liver fluke. Treatment was carried out during hot weather, so the drug, which has a melting point of 24°C., was fluid. It was injected directly into the rumen in doses of 8-10 ml. (0.2-0.3 g./kg. body wt.). A few sheep showed various transient nervous symptoms. The animals were not starved before treatment except for one batch of 200 which were starved for 20 hours: nervous symptoms after injection were more pronounced in these. Examination of faeces 10 days after treatment (number of sheep not stated) failed to reveal fluke eggs.—R.M.

Osinga, A. (1960). Toepassing van hexachlorofoon (G-11) bij distomatose van runderen en schapen. [Hexachlorophene in fascioliasis in cattle and sheep.] —Tijdschr. Diergeneesk. 85, 529-533. [In Dutch. Summary in English.] 3621

Hexachlorophene was administered by s/c inj. at 10-15 mg./kg. body wt. as a 10% soln. in olive oil, or by mouth at 10-12.5 mg./kg. as a 10% soln. in propylene glycol or "polyethylene-300". Subcutaneous injection caused a large swelling that took months to subside: of 9 cattle treated 8 were still excreting fluke eggs after 4 weeks. 51 cattle and 23 sheep were treated by oral administration. Indigestion, diarrhoea and drop in milk yield sometimes followed treatment. In general the drug was no better than hexachloroethane in cattle, but it was an improvement on carbon tetrachloride in sheep. The author considered the drug should not be used until more was known about its toxicity and residues in milk and meat. [See also V.B. 29, 1112 & 3515.]—R.M.

Sinclair, K. B. (1960). Serum calcium and magnesium levels in sheep infected with *Fasciola hepatica*.—Vet. Rec. 72, 506. 3622

Four lambs were given 600 cercariae of *F. hepatica* by mouth and four were given 4 doses each of 150 cercariae weekly. The serum Ca content in both groups declined steadily from the 80th day after infection and

at 183 days was 2 mg.% less than in 2 uninfected lambs. The serum Mg content fluctuated widely in the group given 4 doses of cercariae, and in both groups was lower than in controls; in 4 lambs it fell to 1.3 mg.% or less.—M.G.G.

Grigoryan, G. A. (1959). [Clinical features and treatment of *Fasciola gigantica* infestation in sheep.]—Trudy gel'mint. Lab. 9, 76-78. [In Russian.] 3623

The studies were based on 34 sheep experimentally infected with between 2 and 20 metacercariae per kg. body wt. Acute, subacute and chronic forms of infestation were observed. Some died from anaemia caused by haemorrhage during mass migration of flukes through the viscera. The incubation period varied from 35 to 60 days. For combined therapy with hexachloroethane by mouth and carbon tetrachloride injected direct into the rumen, the dose of hexachloroethane could be reduced from 0.2 g./kg. body wt. to 0.1 g./kg. (with the dose of CCl_4 remaining constant at 1 ml.) without affecting the efficacy of the treatment. Eggs ceased to appear in the faeces 4-6 days after treatment and all sheep were free from flukes at slaughter. An alternative effective treatment was 1.5 g. hexachloroethane dissolved in 2 ml. CCl_4 and injected direct into the rumen; this mixture was ineffective when injected s/c. [See also V.B. 29, 2538.]—R.M.

Wright, C. A. (1960). Relationships between trematodes and molluscs.—Ann. trop. Med. Parasit. 54, 1-7. [Author's summary.] 3624

An attempt is made to show that the concept of the 'genetic species' is a valuable one in the taxonomy of the digenetic trematodes, and that it is only by accepting this basis that more constructive approaches can be made towards trematode taxonomy and to a better understanding of the fluke diseases of man and animals. The digenetic trematodes do, in fact, occur in 'actually (or potentially) interbreeding natural populations', and these populations are delimited by the distribution patterns of their molluscan intermediate hosts. It is emphasized that host-restriction between the larval stages of flukes and their molluscan hosts is usually much greater than it is between the adult forms and their vertebrate hosts. Suggestions as to possible methods of formation of new host-parasite relationships are made, particularly in the case of flukes which have a free-swimming miracidium.

Shiff, C. J. (1960). Observations on the capability of freshwater vector snails to survive dry conditions.—J. trop. Med. Hyg. 63, 89-93. 3625

Numbers of snails were subjected to desiccation on damp mud and in constant humidity chambers under various conditions of temperature fluctuations. It was observed that *Bulinus* (*Phyopsis*) *globosus* and *Biomphalaria pfeifferi* survived out of doors on damp mud if protected from direct sunlight; *Lymnaea natalensis* did not resist dryness for long but could oviposit on damp mud, the eggs survived for up to 20 days, hatched and the minute snails survived in suitable conditions out of the water. Constant humidity experiments revealed that only a small proportion of adult *L. natalensis* can survive exposure to even water-saturated air. This was not the case with *B. pfeifferi* and *B. globosus*.—T.E.G.R.

Breza, M. & Jurašek, V. (1960). K problematice strongyloidózy prasiec v našich chovoch. [Strongyloides infestation in piglets.]—Vet. Čas. 9, 143-154. [In Slovak. Summaries in English, French, German and Russian.] 3626

Ova of *Oesophagostomum dentatum* were present in 386, of *Ascaris suum* in 193, of *Trichocephalus suis* in 116, of *Strongyloides ransomi* in 96, and of metastrongylid species in 59 faecal samples from 598 piglets. Coccidia were present in 193 samples. Details were given of the biology of *S. ransomi*, a technique for examination of faeces of unweaned piglets, preventive measures and treatment with gentian violet in doses of 0.05 g./kg. body wt.—E.G.

Ferri, A. G., Correa, W. M. & Martins, L. F. (1960). A roundworm of the duck beak epidermis.—Poult. Sci. 39, 490-492. 3627

Adults, larvae and embryonated bioperculated eggs of a *Capillaria* sp. were found in the epidermis of 4 ducks' beaks.—M.G.G.

Elliott, D. C. (1960). A search for infections of *Trichinella spiralis* in New Zealand pigs.—N.Z. vet. J. 8, No. 2 p. 28. 3628

No trichinella was found in rats fed 1,291 samples of diaphragm from New Zealand pigs.—M.G.G.

Riek, R. F. & Keith, R. K. (1960). Effect of X-rays on the development of the infective larvae of *Oesophagostomum radiatum* (Rud. 1803) (Strongylidae: Nematoda).—Nature, Lond. 186, 981-982. 3629

Of 10 calves each given 7,000 infective larvae of *Oes. radiatum* which had been exposed to 20,000 r of X-radiation, 5 were killed between 3 and 8 weeks later. The number of larvae recovered was much less than in calves given untreated larvae and nearly all of them were females. The few eggs recovered from the calves' faeces appeared to be infertile.—M.G.G.

Soulsby, E. J. L. & Stewart, D. F. (1960).

Serological studies of the self-cure reaction in sheep infected with *Haemonchus contortus*.

—Aust. J. agric. Res. 11, 595-603. [Authors' summary modified.] 3630

The serological reactions which occur during self-cure of sheep infected with *H. contortus* were investigated by complement fixation, haemagglutination and the Ouchterlony agar diffusion precipitin techniques. A test to detect incomplete antibodies was applied to some sera.

Absorption tests demonstrated that the antibodies detected by the c.f. test and the h.a. test could be differentiated. Evidence is presented that the main antigenic stimulation at self-cure is derived from substances released during the third ecdysis.

Dunsmore, J. D. (1960). **Retarded development of *Ostertagia* species in sheep.**—Nature, Lond. 186, 986-987. 3631

Three lambs were each inoculated in the rumen with 1,000 and three with 100,000 infective larvae of *Ostertagia* species. Measurement of the worms 14 days later revealed that in the lambs given the large dose 35-75% of the worms were only 1-2 mm. long and most of the remainder about 5-8 mm., whereas in lambs given the small dose only 2% of the worms were retarded and most were about 6-11 mm. long. In 2 lambs given 100,000 larvae and killed after 56 days, 28% of the worms were less than 4 mm. long; the sexually mature worms were stunted and faecal egg counts were low and erratic.

—M.G.G.

Dunsmore, J. D. (1960). **Anthelmintic treatment of the smaller abomasal trichostrongyles of sheep.**—Vet. Rec. 72, 573-578. 3632

Controlled tests used a total of 103 sheep infested naturally with a variety of gastro-intestinal nematodes, although only the effects on *Ostertagia* spp. and *Trichostrongylus axei* were recorded. The drugs were administered by intraruminal injection or orally after swabbing the mouth with 10% copper sulphate

solution. The dose rates were: phenothiazine, 15 g. per animal; bephenium salts, 5 g. per animal; Bayer L13/59, 110 mg. per kg.; and Bayer 21/199, 7 mg. per kg. Results were assessed by comparison of the worm burden with that of a control group. The controls were killed 24-48 hours after the drugs were administered to the treated sheep and these were killed 5-6 days after treatment.

Two samples of phenothiazine were used, one having a specific surface area of 18,000 sq. cm. per g. and the other 18,700 sq. cm. per g. In all experiments the action of phenothiazine was superior when it was injected into the rumen. It was suggested that prolonged exposure to phenothiazine is necessary for adequate anthelmintic action and that this does not result when the drug passes straight to the abomasum. The two phenothiazine preparations, although of comparable particle size, were significantly different in their anthelmintic action. In the absence of purity data for the samples this difference could not be clarified. The more active sample was highly efficient against the mature parasites of both species and moderately effective against the immature stages of *Ostertagia* spp.

Bayer 21/199 (3-chloro-4-methyl-7-oxy-coumarine diethyl thiophosphoric acid) was given by intraruminal injection only and was 85% effective against adult *T. axei* but ineffective against adult *Ostertagia* spp. It was 76% effective against immature stages of *Ostertagia* spp. Bayer L 13/59, (O, O, dimethylhydroxy-2, 2, 2-trichlorophosphonate) given orally was highly effective against adult *Ostertagia* spp. and *T. axei* and immature *Ostertagia* spp. Given intraruminally it was without effect against adult parasites.

Bephenium embonate was without effect against either species whether administered into the rumen or abomasum. Bephenium hydroxynaphthoate by intraruminal inj. was without effect against mature *Ostertagia* spp. but moderately effective against immature *Ostertagia* spp. and adult *T. axei*. When given orally as specified above the drug was highly effective against all stages of *Ostertagia* spp. and adult *T. axei*.

Ostertagia spp. were less susceptible to all treatments than *T. axei*, and the author concludes that the bephenium compounds and the organic phosphorus compounds have no advantage over phenothiazine for either *Ostertagia* spp. or *T. axei*. An efficient sample of phenothiazine will remove a high proportion of adult *Ostertagia* spp. and *T. axei* and a

fair percentage of immature *Ostertagia* spp.

—T. E. GIBSON.

Campbell, D. J., Diamond, D. L. & Kingscote, A. A. (1960). *Nematodiriasis in calves*.—*Canad. vet. J.* 1, 119-122. [Authors' summary modified.] 3633

An outbreak of persistent diarrhoea caused by *Nematodirus* in housed calves is described. Bephenium embonate eliminated the nematodes in a limited number of calves.

The histology of the small intestine of a calf which harboured 4,700 *N. helvetianus* is described.

Furmaga, S. (1960). Untersuchungen über die Wirksamkeit von Neguvon auf Magen-Darmstrongyliden der Schafe. [Efficacy of Neguvon against gastro-intestinal strongylid parasites in sheep.]—*Berl. Münch. tierärztl. Wschr.* 73, 181-184. [Summary in English.] 3634

Neguvon (Dipterex) was administered orally in a single dose of 50, 80 or 100 mg./kg. to 16 of 20 sheep with strongyle infestation. Eggs were counted in the faeces daily for 6 days after treatment. The animals were then slaughtered. It was concluded that 50 mg./kg. killed *Haemonchus contortus*, and 80-100 mg./kg. had a partial effect on *Ostertagia*, *Oesophagostomum* and *Bunostomum*. Toxic symptoms were seen in 2 of 4 sheep given 100 mg./kg.—M.G.G.

Symons, L. E. A. (1960). Pathology of infestation of the rat with *Nippostrongylus muris* (Yokogawa). II. Chemical constituents of the jejunum and dry weight of the mucosa. III. Jejunal fluxes in vivo of water, sodium, and chloride. IV. The absorption of glucose and histidine.—*Aust. J. biol. Sci.* 13, 163-170; 171-179 & 180-187. [Author's summaries modified.] 3635

I. There was a 50% gain in the dry weight of the mucosa relative to the unit length of the jejuna of rats infested by the nematode *N. muris*. The importance of this to measurements of the rate of intestinal fluxes is discussed.

The concentrations of the electrolytes sodium and chloride were increased in total jejunal tissue on both a wet weight and a fat-free dry weight basis. Potassium concentration increased on the dry weight basis but was unchanged in wet tissue. The water content of this tissue was also greater in the infested rats but the fat content fell. There was a twofold increase in the volume of whole

blood in the jejunum. The physiological significance of these changes is not clear but their possible association with undernourishment is suggested.

II. The net fluxes of water, sodium, and chloride were measured *in vivo* by perfusion of the jejunum. There was a net absorption of these three substances from isotonic saline solutions in normal rats, but a net influx to the lumen in each instance in rats infested with *N. muris*. The unidirectional fluxes of sodium and the net fluxes during perfusion with hypo- and hypertonic saline solutions indicated that this was fundamentally due to a derangement of efflux while influx was unaffected. The gross effect, however, was also due to an increase of influx because of the greater weight of mucosal tissue per centimetre of jejunum in the infested animal. The unidirectional fluxes of water did not support these conclusions unequivocally. The fluid which accumulates in the infested small intestine can be explained by these results.

III. The rate of absorption of D-glucose and L-histidine from the entire small intestine of the rat when measured by an intubation technique was not affected by infestation with *N. muris*. On the other hand, absorption of D-glucose from the infested jejunum when measured *in vivo* by a perfusion technique was severely reduced. The rate of gastric emptying was not affected by the infestation. There was a direct relationship between gastric emptying and the rate of absorption of glucose.

Grégoire, C., Pouplard, L., Cotteleer, C., Rase, F. & Jaumin, J. (1960). Prophylaxie de la bronchite vermineuse par la rotation. [Prophylaxis of parasitic bronchitis by pasture rotation.]—*Ann. Méd. vét.* 104, 181-190. 3636

Experience with young cattle and sheep indicated that pasture should be divided into nine fields, allowing 4 days' grazing and 32 days' rest on each.—R.M.

Fisher, E. W. & McIntyre, W. I. M. (1960). Disturbance of respiration of calves caused by pneumonia due to *Dictyocaulus viviparus*. The changes taking place in respiratory rate, ventilation rate, plasma CO₂ content and plasma pH.—*J. comp. Path.* 70, 377-384. [Authors' conclusions modified.] 3637

Measurements of respiratory rate, ventilation rate, plasma pH and plasma CO₂ content were made on calves with pneumonia caused by *D. viviparus*.

A greatly increased respiratory rate was

accompanied by a smaller increase in ventilation rate, indicating shallower respiration.

No marked decrease from normal was found in the plasma pH but the plasma CO₂ content was significantly above normal, indicating a compensated respiratory acidosis.

Rosenberger, G. & Heeschen, W. (1960). Behandlungsversuche gegen den Lungenschwammbefall der Rinder mit "Certuna"-Bayer. [Treatment of lungworms in cattle with "Certuna", the piperazine salt of the levulinic acid hydrazone of cyanacetylhydrazide.] — Dtsch. tierärztl. Wschr. 67, 403-405. [Summary in English.] 3638

The authors claimed that this derivative is better tolerated than cyanacetylhydrazide itself and can be given in larger and more effective doses. They gave by mouth 60 mg./kg. body wt. as a 30% soln., repeated the following day, to 48 cattle experimentally infected with between 2,000 and 3,000 larvae, and also 1,073 field cases in which the illness was classified into 5 degrees of severity.

Efficacy was controlled by counting lungworm larvae in the faeces 1 and 2 weeks after treatment and by clinical examination after 2 and 4 weeks.

Complete results are shown in a table. Of 356 treated twice with 60 mg./kg., all excreted larvae before treatment and only 52 excreted larvae a week afterwards; 107 recovered, 143 showed some improvement, 98 did not improve and 4 had to be slaughtered. Another 455 cases were treated for 3 days with 60 mg./kg. or for 2 days with 90 mg./kg. and the results were similar to those in animals given 60 mg./kg. for 2 days. The higher dosage caused posterior paresis in some youngstock and convulsions in 3 older animals.—R.M.

Panasnyuk, D. I. & Polyakova, O. I. (1959). [Allergic test for *Dictyocaulus filaria* in sheep.] — Trudy gel'mint. Lab. 9, 222-224. [In Russian.] 3639

Three antigens composed mainly of polysaccharides were prepared from lungworms by the methods of Melcher, Boivin, and Kuzin & Polyakova. A fourth prepared from saline extract of dried, de-fatted worms proved unsatisfactory. They were tried in dilutions of 1: 200-1: 20,000 on 960 infected sheep and 18 calves, by means of i/d injection into the tail fold of 0.2 ml. Subcutaneous injections and instillations into the conjunctiva were also done. Optimum dilution lay between 1: 5,000 and 1: 10,000. A positive result was a hot,

tender swelling with increase of skin thickness to 10-12 mm. Detailed results are not given in this paper.—R.M.

Bolkhovitinov, D. Z. (1959). [Reaction of sheep to superinfection with *Dictyocaulus filaria*.] — Trudy gel'mint. Lab. 9, 50-53. [In Russian.] 3640

Twelve sheep were super-infected: six were naturally infected adults and six were experimentally infected lambs. Larvae cultured for between 8 and 70 days were administered in doses of between 140 and 10,000. Details of these doses, duration of the period of superinfection, and post-mortem data are given in a table, to which reference should be made. Infection took place on 1-8 occasions separated by intervals of 32-120 days. In general, the findings of other workers on resistance to superinfection were confirmed. The parasite took longer to reach maturity (up to 186 days).—R.M.

Ozerskaya, V. N. (1959). [Ditrazin (diethylcarbamazine) as an anthelmintic against sheep lungworms.] — Trudy gel'mint. Lab. 9, 208-210. [In Russian.] 3641

This paper is based on work previously reported [*V.B.* 27, 828] but in this version the author mentions that both the citrate and the phosphate of diethylcarbamazine were tried. The citrate was injected s/c into 18 infested sheep as 1: 3 aqueous soln. at 0.1-0.2 g./kg. body wt. In every case excretion of larvae in the faeces stopped 10-12 days after treatment and no worms were found at slaughter. The phosphate was injected into 18 infested sheep. Four were given 0.05 g./kg.; one was freed from lungworms and in the other 3 the number of worms was reduced by up to 80% in comparison with untreated controls. The other 14 were given 0.1 g./kg. and all ceased to excrete larvae in the faeces; four were slaughtered and lungworms were found only in one. The phosphate was also tried on 2 infested sheep provided with tracheal fistulas for collection of larvae.

Normal doses of diethylcarbamazine salts caused no tissue reaction at the site of s/c injection. The phosphate was recommended for general use because phosphoric acid was cheaper and more abundant than citric acid. —R.M.

Sirigu, A. (1960). Contributo al trattamento della broncopolmonite verminosa dei bovini e delle pecore con la cianacetidrazide. [Cyanacetylhydrazide in the treatment of lungworms in cattle and sheep.] — Clin. vet.,

Milano 83, 39-44.

3642

Literature on the treatment of lungworms is reviewed, with special reference to cyanacethydrazide, and personal small scale observations are recorded. It is concluded that the drug is effective in cattle with heavy infestation and in sheep with light infestation in the initial stages.—T.E.G.R.

Foster, R. G., Jr., Ryan, C. B., Turk, R. D. & Quisenberry, J. H. (1960). **Continuous feeding of hygromycin as a poultry anthelmintic and its effect upon laying house performance.**—Poult. Sci. 39, 492-499. 3643

Six groups each of 189 pullets were used to test hygromycin B as an anthelmintic and its effect on performance. Two groups received basal ration only, the other two the basal ration plus hygromycin B at 6 g. and at 12 g. per ton. Initially the birds were kept in cage brooders but at 19 weeks they were transferred to range. At 20 weeks selected birds were transferred to laying cages. The birds were weighed monthly, and five from each group were killed each month and worm counts made. Hygromycin B was more effective against *Heterakis* than against *Ascaridia*. The number of parasitized birds in the groups receiving 12g. of hygromycin per ton of food was lower than in the other medicated groups and in these in turn was lower than in the control group. The treatments likewise reduced the number of parasites per bird although low parasite burdens were present in the control groups. Continuous feeding of hygromycin B improved production and food utilization but there was evidence that 12 g. per ton was in excess of the optimum. For optimum results the supplement should be fed in both the growing and laying periods.—T. E. GIBSON.

Duke, B. O. L. (1960). **Studies on loiasis in monkeys. III. The pathology of the spleen in drills (*Mandrillus leucophaeus*) infected with *Loa*.**—Ann. trop. Med. Parasit. 54, 141-146. [Author's summary modified.] 3644

The macroscopic and histological changes associated with the destruction of *Loa* microfilariae in the monkey are described. When microfilariae invade the peripheral blood, numerous subcapsular granulomata develop in the spleen, producing a grossly nodular appearance. Blood percolates through the granulomata; in them microfilariae are destroyed by macrophages and giant-cells; this process is accompanied by infiltration

with eosinophiles.

The destruction of microfilariae in the spleen accounts for the regular suppression of their numbers in peripheral blood, a phenomenon which may be observed in all drills infected with *Loa*.

The changes in the spleen may be peculiar to the monkey; there is no evidence that similar changes occur in the human spleen.

Tobie, J. E. & Beye, H. K. (1960). **Fluorescence of tetracyclines in filarial worms.**—Proc. Soc. exp. Biol., N.Y. 104, 137-140. [Authors' summary modified.] 3645

After administration of tetracycline to a patient having migrating, subcutaneous filarial worms, parasites were localized and visualised as yellow-fluorescent tracts beneath the skin following stimulation with UV light. Exposure of microfilariae of *Dirofilaria immitis* to a solution of chlortetracycline resulted in uptake of antibiotic by embryos in amounts which were readily visible by fluorescent methods. Studies on a dog infected with *D. immitis* revealed that the central column of nuclei of each microfilaria specifically took up tetracycline. The drug was also deposited in adult worms making them brilliantly fluorescent. In fresh frozen sections of an adult female worm, the drug was localized throughout the internal structures including the uterus and the embryos it contained.

Rogers, W. P. (1960). **The physiology of infective processes of nematode parasites; the stimulus from the animal host.**—Proc. roy. Soc. Ser. B. 152, 367-386. 3646

The processes by which larvae of *Trichostrongylus axei*, *T. colubriformis* and *Haemonchus contortus*, and eggs of *Ascaris lumbricoides* (pig strain), *Ascaridia galli* and *Toxocara mystax* infect the host were studied. A stimulus from the host was required to start development of the parasite. The stimulus caused larvae to produce 'exsheathing fluid' which completed the second moult, or it caused the production of 'hatching fluid' so that the eggs hatched. The stimulus could be imitated by placing larvae or eggs in bicarbonate-carbon dioxide buffers. At pH 7.3 the concentration of undissociated carbonic acid required to provide the stimulus varied from 0.005 M for *T. axei* to 0.015 M for *H. contortus* and 0.0025 M for the ascarids.

—R.M.

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS

[INCLUDING FOWL PARALYSIS]

Cella, F. & Pezzoli, G. (1959). Sui neuromi traumatici nel cavallo. [**Traumatic neuroma in the horse.**].—Atti Soc. ital. Sci. vet. 13, 165-169. [Summaries in English and German.] 3647

Neuromas developed in 3 horses at the site of neurectomy for lameness.—R.M.

Teternik, D. M., Tsyunskaya, T. A. & Chernin, V. G. (1960). [**Neurogenous neoplasms in cattle.**].—Veterinariya, Moscow 37, No. 5 pp. 56-60. [In Russian.] 3648

The authors stated that neuromas were found in 1.2% of adult slaughtered cattle, but absolute figures are not given. There are details of cases in 31 cows, 2 oxen and 2 bulls aged between 4 and 12 years, with a table showing distribution of lesions in each case. The localizations were hepatic plexus (25 cases), intercostal nerves (25), heart (17), aorta and mediastinum (8), liver (6), spleen (3), cervical plexus (2), muscle (2), lungs (2), lymph nodes (1).—R.M.

Ferri, A. G. & Matera, E. A. (1960). **Glomus tumour in a dog.**—J. comp. Path. 70, 374-376. [Authors' conclusions modified.] 3649

A record of a case of glomus tumour of a digital extremity of a dog with symptoms of acute pain and lameness. From the gross and microscopic picture of the lesion a diagnosis of glomangioma of epithelioid type was made.

The location, symptoms and the gross and histological appearance are identical with those described in human pathology.

Sakurai, Y. (1960). [**Adenoid cystic epithelioma in a dog.**].—J. Jap. vet. med. Ass. 13, 206-208. [In Japanese. Summary in English.] 3650

A male dog about 7 years old had about 50 subcutaneous tumours measuring 1-15 mm. diam. Histologically they closely resembled the adenoid cystic epithelioma (Brooke's tumour) that occurs in man.—R.M.

Jabara, A. G. (1960). **Canine mixed tumours.**—Aust. vet. J. 36, 212-221. [Author's summary modified.] 3651

J. reported the investigation of 27

spontaneous canine mixed mammary tumours. He discussed the frequency, age, sex and breed incidences, sites of occurrence, the association of these tumours with other primary tumours, and their aetiology. The macroscopic and microscopic features of these tumours are reported. Their mode of growth was investigated and is discussed in relation to existing hypotheses on their histogenesis. It was concluded that the mucin, chondrocytes and most (if not all) of the cartilage and bone matrices originate from the tumour epithelium.

Nielsen, S. W. (1959). **Canine oncology: cutaneous epithelial neoplasms and homologous transplantation experiments.**—Dissertation, Ohio pp. 138. [Abst. from Diss. Abstr. 20, 2236-2237.] 3652

Epithelial neoplasms of the skin (excluding virus papilloma and mammary and perianal tumours) were found in 151 dogs. They were classified into sebaceous gland tumours (54 cases), basal-cell tumours (33), squamous-cell carcinoma (31), apocrine sweat gland tumours (14). Three of the last-named were mixed apocrine sweat gland tumours with cartilage formation; there appeared to be no previous record of this type in dogs.

Whole-body irradiation with X-rays (170-600r) plus corticosteroid therapy appeared to favour transplantation of an osteosarcoma, a mixed mammary tumour, and an ovarian adenocarcinoma.—R.M.

Vasil'ev, N. T. (1959). [**Leucosis in cattle.**].—Vestnik sel'skokhoz. Nauk. No. 12. pp. 58-64. [In Russian. Summaries in English, French and German. English summary modified.] 3653

In 140 cows with leucosis, blood studies revealed that the condition persisted for 10-12 months, and only in a few cows did the number of leucocytes return to normal. In calves inoculated with blood from the cows the number of leucocytes reached 20,000-30,000 in a month. P.M. examination revealed enlarged lymph nodes and spleen, infiltrations in the internal organs and foci with accumulated lymphoid cells of various degrees of maturity.

NUTRITIONAL AND METABOLIC DISORDERS

Hafez, E. S. E. (1960). **Nutrition in relation to reproduction in sows.**—J. agric. Sci. 54, 170-178. 3654

Gilts were divided into two groups. The high level group (H) was fed *ad libitum* from weaning to 150 lb. and the low level group (L) was fed 70% of that consumed by the others. After 6 generations half of the pigs in each group were changed to the other level and bred for another 4 generations thus forming 4 groups, HH, HL, LL and LH. 56 gilts of the F10 generation of each group were fed a constant dry ration. They were mated on their third oestrus and 22 slaughtered at 38 days and 13 at 100 days after mating. There were no significant differences between groups in length of Fallopian tubes, weight of corpus luteum, percentage of implantation, number of viable foetuses, weight of foetus plus placental membranes, volume of placental fluids, or embryonic mortality. There were significant differences between the HH and LH groups taken together and the LL and HL groups in weight of pituitary, thyroid and adrenals, weaning weight, puberty weight to birth weight, puberty weight to weaning weight and age of puberty. There were no significant differences between the LH and the HH groups and between the LL and the HL groups.

Observations were also made on the frequency of silent heat, the number of services per conception, ova migration, foetal weight at 38 and 100 days post-coitum and foetal mortality.—E. J. CASTLE.

Avellini, G. (1959). **Dilatatione acuta dell'omaso secondaria a meteorismo schiumoso del rumine nei bovini. [Acute dilatation of the omasum associated with frothy bloat in cattle.]**—Atti Soc. ital. Sci. vet. 13, 550-554. [Summaries in English and French.] 3655

Dilatation of the omasum, secondary to frothy bloat, was diagnosed clinically in three cows by palpation and percussion. Diagnosis was confirmed by manual exploration through the rumen and reticulum. Pathogenesis of the condition is discussed.—T.E.G.R.

Moore, C. L. (1959). **Physiological studies on bloat.**—Dissertation, South Dakota pp. 79. [Abst. from Diss. Abstr. 20, 1935-1936.] 3656

Changes in blood pressure in the carotid artery were recorded in 25 cattle with tympanites from lucerne. Tympanites increased the blood pressure from averages of

175 to 242 mm. Hg. In 50 cases of tympanites there was little change in the amounts of haemoglobin and methaemoglobin in blood.

—R.M.

Benzie, D., Boyne, A. W., Dalgarno, A. C., Duckworth, J., Hill, R. & Walker, D. M. (1960). **Studies of the skeleton of the sheep. IV. The effects and interactions of dietary supplements of calcium, phosphorus, cod-liver oil and energy, as starch, on the skeleton of growing Blackface wethers.**—J. agric. Sci. 54, 202-221. 3657

A factorial experiment was carried out on 48 wether lambs fed a basic diet deficient in calcium, vitamin D, metabolizable energy and to a lesser extent, phosphorus. Extra calcium, cod-liver oil, phosphorus and starch were fed in all possible combinations, giving 16 dietary treatments. Serum Ca and blood inorganic P were determined monthly and radiographs of many of the bones taken at the beginning and end of the experiment, which lasted about 6 months. Finally the sheep were killed and ash weights and percentage ash of bone weights determined. Changes in body wt. and food intake were recorded throughout. Calcium was the greatest single factor in increasing bone ash and percentage bone ash; cod-liver oil and phosphorus having the same effect, to a lesser degree, on certain of the bones only. There was a positive interaction between calcium and cod-liver oil in increasing bone ash and percentage bone ash. Radiographs showed increased bone density in the animals with increased bone ash.

—E. J. CASTLE.

Keating, J. (1960). **Hair analysis in cattle as an index of mineral status.**—Irish vet. J. 14, 74-78. 3658

The assay of the mineral status of animals is discussed. Blood analysis and biopsy present major difficulties, which are enumerated. Hair analysis overcomes these difficulties, shows the mineral status during the period in which growth took place, and is not subject to rapid variations. Brochart's technique was used for determination of Ca, P, Na, and K in Irish Shorthorn dairy cattle. Mean values, in parts per 1,000, were: Ca, 1.78 ± 0.42 ; P, 0.22 ± 0.03 ; Na, 0.25 ± 0.09 ; and K, 0.35 ± 0.16 .—T.E.G.R.

Bartho, P. (1960). **Metabolizmus železa u hovědžieho dobytku. I. Sérové železo a jeho**

kolísanie u zdravého dobytka. [**Iron metabolism in cattle. I. Variations in serum iron in healthy cattle.**]—Vet. Čas. 9, 125-134. [In Slovak. Summaries in English, French, German and Russian.] 3659

Daily and seasonal variations in the serum Fe level were studied in 186 healthy cattle of various ages. In calves up to three months, average values were 124 $\mu\text{g. \%}$, (± 9), in cattle up to 2 years, 154 $\mu\text{g. \%}$ (± 4.24) and in adult cattle 171 $\mu\text{g. \%}$ (± 4). In mature females levels were lower than in mature bulls. Morning values were highest, evening values lowest. Highest values were observed towards the end of spring, lowest in winter.—E.G.

Peirce, A. W. (1960). **Studies on salt tolerance of sheep. III. The tolerance of sheep for mixtures of sodium chloride and sodium sulphate in the drinking water.**—Aust. J. agric. Res. 11, 548-556. [Author's summary modified.] 3660

Six groups, each of 6 sheep, were fed in pens for 15 months on chaffed lucerne and wheat hays. Group (1) was offered rain-water to drink; (2) water containing 1.30% NaCl; groups (3) to (6) water containing mixtures of NaCl and Na_2SO_4 in the following percentages: (3) 1.22 + 0.10, (4) 1.14 + 0.20, (5) 1.05 + 0.30, and (6) 0.89 + 0.50.

The mean daily intakes by the groups were 2.3, 3.8, 3.6, 4.3, 4.2, and 3.7 litres respectively.

The intake increased in all groups with temperature, being 30-60% higher in the hottest than in the coldest months.

The saline drinking waters had no effect on the amount of Na, K, Ca, Mg or Cl in the blood plasma. Sulphate was usually significantly higher in the plasma of the sheep in groups (5) and (6).

None of the saline solutions had any adverse effect on general health, food consumption, weight increase, or wool production.

Hidioglou, M., Prevost, R. & Touratier. (1960). **Le phosphore et le calcium dans les herbes des Savanes de Kourou (Guyane française). La phosphorémie et la calcémie chez les bovidés. Conséquences de l'aphosphorose. [Phosphorus and calcium content of the grass and of the blood of cattle on the Kourou savanna in French Guiana. Effects of phosphorus deficiency.]**—Rec. Méd. vét. 136, 161-187. [Summaries in English and Spanish.] 3661

The Ca and P content of 11 pasture plants was determined monthly for a year on

the Kourou savanna in French Guiana. The average Ca content was adequate (0.224% dry matter) except during January (0.131%), but the P content was low (0.061%). Monthly analysis of samples of whole blood from 20 cattle revealed an average Ca content of 118 mg. per litre and an average P content of 143 mg. per litre. Animals in poor condition tended to have a lower Ca and higher P content in the blood than healthy cattle. It was concluded that P deficiency is the cause of low fertility, slow growth, osteodystrophy and other disorders of cattle in this region.

—M.G.G.

Meyer, H. & Steinbeck, H. (1960). **Der Einfluss hoher Phosphor- und Kaliumgaben auf den Magnesiumstoffwechsel beim Rind. [Effect of high doses of phosphorus and potassium on magnesium metabolism in cattle.]**—Dtsch. tierärztl. Wschr. 67, 315-319. [Summary in English.] 3662

Oral administration of 41-51 g. daily of P as ammonium phosphate to 2 bulls for 14 days increased the absorption of Mg by 5-6% and trebled the retention of Mg. Administration of K so that the dietary K:Mg ratio was 25-36:1 reduced Mg absorption by 14-20%. The blood content of Mg rose very slightly when P was given and fell slightly when K was given. Administration of both P and K reduced Mg absorption by 16%, greatly depressed the excretion and blood content of Mg, and increased the retention. In lactating cows given both P and K the blood Mg content fell to 1 mg.%.—M.G.G.

O'Hara, P. J., Newman, A. P. & Jackson, R. (1960). **Parakeratosis and copper poisoning in pigs fed a copper supplement.**—Aust. vet. J. 36, 225-229. [Authors' summary modified.] 3663

Parakeratosis and apparent chronic copper poisoning occurred in pigs receiving a dry grain meat meal diet supplemented with hydrated copper sulphate at the rate of 0.1%. The lesions of parakeratosis and the marked response to a zinc supplement (0.4% ZnSO_4) are described. The clinicopathological syndrome of what was considered to be atypical copper toxicity is described. The lesions were typical of chronic copper poisoning except for the absence of icterus and haemoglobinuria. Anoxia and circulatory failure were the apparent causes of death. The atypical features of the disease are discussed and possible metabolic relationships between copper and zinc are indicated.

Mehring, A. L., Jr., Brumbaugh, J. H., Sutherland, A. J. & Titus, H. W. (1960).

The tolerance of growing chickens for dietary copper.—*Poult. Sci.* 39, 713-719. [Authors' summary modified.] 3664

The minimum toxic level of Cu was about 500 p.p.m. The chicks whose growth was depressed by the higher levels in the diet, grew more rapidly after the Cu supplement was omitted from their diet at ten weeks of age. The chicks that received the highest level of Cu (1,176 p.p.m.) weighed little more than half as much, at 10 weeks of age, as the controls. At 16 weeks of age, after receiving the basal diet without added Cu for six weeks, the chicks that had received the highest level of Cu in their diet weighed about four-fifths as much as the controls.

There was an increase in the storage of copper, molybdenum, and sulphate in the liver and spleen of chicks fed the diets containing added Cu.

There was an improvement in the feed efficiency of chicks that were fed diets with added Cu below the toxic level; which suggests that the copper may have an effect similar to that of antibiotics.

Marsh, H. & Swingle, K. F. (1960). **The calcium, phosphorus, magnesium, carotene, and vitamin A content of the blood of range cattle in Eastern Montana.**—*Amer. J. vet. Res.* 21, 212-221. 3665

For 60 cows run continuously on grass on the Great Plains, average values over three years were phosphorus 3.7 mg., Ca 9.8 mg., Mg 1.6 mg., carotene 265 μ g. and vitamin A 30 μ g. per 100 ml. The only difference with increasing age was a decrease in the phosphorus content. Fluctuations with season and rainfall were studied.—R.M.

Dehority, B. A., Hazzard, D. G., Eaton, H. D., Grifo, A. P., Jr., Rousseau, J. E., Jr., Helmboldt, C. F., Jungherr, E. L. & Gosslee, D. G. (1960). **Some biochemical constituents in serum, cerebrospinal fluid, and aqueous humor of vitamin A deficient Holstein calves.**—*J. Dairy Sci.* 43, 630-644. 3666

16 bull calves, 63 days old, were fed a vitamin A deficient ration until their plasma vitamin A decreased to 12.0 μ g./100 ml. or less. Each calf was then fed one of four carotene intakes for 16 weeks. These were 16 or 24 μ g./lb. body wt. per day calculated to cause marked increases in cerebrospinal fluid pressure, 32 μ g. to cause slight elevation of pressure or 40 μ g. to provide no elevation.

Terminal c.s.f. pressure decreased with increasing intakes of carotene but there were no significant changes in apparent intraocular pressure or in electrocardiograms. Vitamin A and carotenoid concentrations in liver and plasma increased with dosage. There were no significant differences between groups in the biochemical constituents of serum and c.s.f. except that the potassium in c.s.f. decreased slightly with increasing carotene intake. In the aqueous humour, however, sodium was higher in the calves fed the lower amount of carotene, potassium increased with increased carotene intake, chlorine decreased and osmotic pressure was greatest in the calves fed the 16, 24 and 32 μ g. carotene levels.

—E. J. CASTLE.

Mameesh, M. S. & Johnson, B. C. (1960). **The absence of hemorrhagenic compounds in irradiated beef.**—*J. Nutr.* 71, 122-124. [Authors' summary modified.] 3667

Studies of the haemorrhagic syndrome observed in rats fed irradiated beef indicated that it was caused by a lack of vitamin K and not by any hypoprothrombinaemic factor in irradiated beef. This conclusion was based on the observations that: (1) when the level of irradiated beef in the diet was increased, the incidence and severity of haemorrhages decreased; and (2) the vitamin K requirement of rats prevented from coprophagy and fed a diet high in irradiated beef was the same as that of rats fed a purified diet.

Peltola, P. (1960). **Goitrogenic effect of cow's milk from the goitre district of Finland.**—*Acta endocr., Copenhagen* 34, 121-128. [In English.] 3668

Milk from districts where goitre is endemic in man was fed to rats. After 1-2 years the thyroids were nearly twice the size of those from rats fed milk from goitre-free districts. Excess iodine in the food did not suppress this effect. It was concluded that goitrogens in milk were more important than iodine deficiency as a cause of human goitre in Finland. [See also *V.B.* 30, 3008.]—R.M.

Gibson, H. B., Howeler, J. F. & Clements, F. W. (1960). **Seasonal epidemics of endemic goitre in Tasmania.**—*Med. J. Aust.* 4th June, 875-880. 3669

Goitre in man coincided with the spring flush of pasture and weeds such as wild radish and wild turnip. The possibility of a goitrogen in milk was discussed.—R.M.

I. Wilkinson, J. S. (1960). **Spontaneous diabetes mellitus.**—Vet. Rec. 72, 548-554 & 555. 3670

II. Keen, H. (1960). **Spontaneous diabetes in man and animals.**—Ibid. 555-557. [Authors' summaries modified.] 3671

I. An account is given of diabetes in 56 dogs and 2 cats with special reference to clinical features, treatment and P.M. findings. Factors affecting the onset of the disease, particularly oestrus in the female, are indicated.

II. The causes of diabetes mellitus remain unknown in both man and animals. Despite certain species similarities, there are some important differences in clinical manifestation, in aetiological factors and in the liability to long-term complications of the disease. Further study of the disparities might shed light upon some current problems in the investigation and treatment of diabetes in man.

DISEASES, GENERAL

Goldstein, H. E. (1960). **Epidemiology and the diagnostic laboratory.**—Proc. 63rd Meet. U.S. Livestock Sanit. Ass. San Francisco, 1959. pp. 371-376. 3672

The importance of the role of the diagnostic laboratory in epidemiology is discussed, and an account is given of some epidemiological investigations carried out.

—T.E.G.R.

Anon. (1960). **FAO/OIE Animal Health Year Book for 1959.** pp. 249. Rome: Food and Agriculture Organisation. Paris: Office International des Epizooties. [In English, French and Spanish.] 12s. 6d. 3673

This yearbook presents the occurrence of major diseases in 117 countries. The 84 tables which form the bulk of the book are similar to those in the previous edition [V.B. 30, 2307] but there are interesting innovations in the last 65 pages; these include notes on the occurrence of diseases of bees and fishes; livestock populations and numbers of veterinarians; notes on some diseases in Asian countries, tick-borne diseases, and vibriosis in cattle.—R.M.

Baker, J. A., Robson, D. S., Gillespie, J. H., McEntee, K. & Langer, P. H. (1960). **Vaccination of cattle for increased profits.**—Proc. 63rd Meet. U.S. Livestock Sanit. Ass. San Francisco, 1959. pp. 143-165. 3674

The economic aspect of disease prevention is discussed. Reliable serological tests revealing the incidence of diseases provide a basis for the assessment of ensuing economic losses. It is considered that vaccination is the best means of increasing productivity and profits, especially in such diseases of cattle as leptospirosis, infectious bovine rhinotracheitis-infectious pustular vulvovaginitis, and virus diarrhoea; the vaccines against these 3 diseases could be combined into one and would be cheaper to produce and use.

—T.E.G.R.

de Gruchy, P. H. (1960). **Diseases and toxæmia transmissible to man from poultry and poultry products.**—Roy. Soc. Hlth J. 80, 139-141 & 138. [Discussion: p. 151.] 3675

With the exception of salmonellosis, none of the 12 diseases listed is likely to be a serious problem. Some, such as Newcastle disease, ornithosis (psittacosis), erysipelas and aspergillosis, could be occupational hazards for workers in the poultry rearing and processing industries.—M.G.G.

McCarthy, P. H. (1960). **Facial lesions of horses in Central Queensland correlated with recent rains.**—Aust. vet. J. 36, 242-243. 3676

Three apparently distinct clinical conditions are seen on the faces of a small percentage of stock horses in Central Queensland after summer rains. These are (a) dermatitis of the blaze, which appears after the new flush of grass, most frequently in young horses, and which is thought to be a photosensitivity; (b) multiple papillomatous growths of the muzzle; (c) a non-specific labial dermatitis.

—A. CULEY.

Pulles, H. A. (1960). **Über Ekzema solare oder Sonnenbrand (Klee- und Lichtkrankheit).** [Photosensitization in cattle in the Netherlands.]—Tierärztl. Umsch. 15, 52-54. 3677

P. discussed the incidence, clinical picture and treatment of photosensitization in Dutch cattle. The cause is not known, but plants (not specified) may be implicated. Exposed to light, the unpigmented areas of the skin become hard, cracked, and there is scab formation. The condition responded to i/v doses of 100 ml. of "Otrhomin" (hexamethylene-tetramine thiocyanic acid).—E.G.

Lambelin, G. & Ectors, F. (1960). **Note préliminaire sur une maladie des bovidés ayant fait son apparition en Ituri en 1958.** [A disease of cattle of unknown aetiology in Ituri.]—Ann. Soc. belge Méd. trop. 40, 183-

187. [In French. Summaries in Flemish, English, German and Spanish.] 3678

Outbreaks of a fatal disease of cattle were observed in Ituri (Belgian Congo) during 1958. Symptoms included high fever, blood-stained diarrhoea and pronounced dyspnoea; death occurred in 12-24 hours. P.M. examination revealed haemorrhagic gastro-enteritis, pulmonary oedema or bronchopneumonia, haemorrhages in the myocardium and lymph nodes and congestion of the meninges. No deaths occurred in 27 cattle inoculated with blood or organ material from affected animals, but 4 had fever and one of these a transitory stiffness of the forelimbs. Sheep, rabbits, g.pigs and mice were refractory. Investigations excluded bacteria, protozoa, parasites, Rift Valley fever and arsenical poisoning as the cause. It was probably not plant poisoning. A virus is suspected. —M.G.G.

MacKellar, J. C. (1960). **The occurrence of muscular hypertrophy in South Devon cattle.** —*Vet. Rec.* 72, 507-510. 3679

Of 500 herds of South Devon cattle, over 250 contained one or more animals with some degree of muscular hypertrophy. The incidence was higher in herds in which beef type rather than milking type was bred. The condition is sometimes associated with difficult parturition caused by the large size of the foetus. It occurs in other breeds of cattle, particularly in Friesians, and is a feature of the Charollais breed. A mild degree is desirable in beef cattle, but in its severe form the meat is tough and dry.—M.G.G.

I. Yamagiwa, S., Satoh, H. & Goto, M. (1959). **Cortical cerebellar atrophy of granular type in Japanese cattle.**—*Jap. J. vet. Res.* 7, 126-138. [In English.] 3680

II. Goto, M., Itagaki, K., Yamane, O., Fujihara, H., Fujimoto, Y., Ohshima, K., Satoh, H. & Yamagiwa, S. (1959). **Pathological studies on so-called "Kiriyo disease".**—*Ibid.* 156-170. [In English.] 3681

I. The name Kiriyo disease is derived from Kiri = fog and yoi = to be intoxicated. It is a fatal endemic disease of young cattle at grass during the spring in the mountains of western Honshu. The main symptoms are ataxia, fall in body temp., syncope, loss of skin sensitivity, weakness, rotation of the eye, clonic convulsions. Examination of the c.n.s. from 12 cases revealed atrophy of the granular layer in the cerebellar cortex, depicted in 5 plates of photomicrographs.

II. 15 cattle that died from Kiriyo disease (and one that was slaughtered) were examined. Congestion of the lungs, liver, spleen and kidneys; dilatation of the right ventricle or both ventricles; sub-endocardial or epicardial haemorrhages; anaemia and sometimes hydrothorax and ascites were present. These pointed to acute hypoxia. In addition there was often catarrhal bronchopneumonia, enlarged lymph nodes, catarrhal gastro-enteritis and necrotic foci in the liver. Parenchymatous diffuse goitre was present in every case. Clinical observations revealed that affected animals were hypoglycaemic, and it was suggested that this could have caused the cerebellar lesions. The cause of Kiriyo disease remains obscure.—R.M.

Colombo, S. (1959). **Le emorragie intramurali della arteria polmonare nel vitello. [Intramural haemorrhages in the pulmonary artery in calves.]**—*Atti Soc. ital. Sci. vet.* 13, 424-428. [Summaries in English and German.] 3682

The condition was observed in 673 of 2,525 slaughter calves aged about 2 months. It is ascribed to fragility of the vasa vasorum in relation to the arterial wall not yet adapted to the blood pressure.—T.E.G.R.

Stamp, J. T. (1960). **Muscular dystrophy in sheep and neonatal mortality.**—*J. comp. Path.* 70, 296-304. [Author's conclusions.] 3683

A considerable incidence of muscular dystrophy found in both ewes and lambs is unconnected with scrapie or vitamin E deficiency and the etiological factor could not be determined.

The relationship between the lesions of muscular dystrophy, the perinatal mortality and the peculiar dysfunction of the legs and necks of a number of the lambs which survived could not be ascertained.

The fact that over the last few years a considerable number of outbreaks of serious perinatal mortality in sheep have been reported throughout Britain from which no pathogens could be isolated makes further investigation of such losses as those described above very necessary.

Osetrov, A. A., Trifonova, T. K., Chebotarev, I. E. & Aksenov, N. S. (1960). **[Disease caused by feather-grass awns in sheep in Kazakhstan.]**—*Veterinariya, Moscow* 37, No. 5 pp. 37-41. [In Russian.] 3684

Illness caused by awns penetrating the

skin occurred on a large scale in 1958. From a study of the skins of slaughtered sheep, 11.4% were severely affected (up to 100 awns per 100 sq.cm. of skin), 34.3% were moderately affected (10-19 awns per 100 sq.cm.) and 54.3% were lightly affected (1-9 awns per 100 sq.cm.). Death occurred from secondary salmonella infection in 20 of 61 cases. [See also *V.B.* 27, 228.]—R.M.

Armstrong, M. C. (1960). **Paradontal disease of sheep in South Canterbury. Preliminary report on investigations.**—*N.Z. J. Agric.* 100, 429 & 431. 3685

The disease is characterized by degeneration and shrinkage of the tissues surrounding some of the teeth, impaction of food around the teeth, decay of the teeth and inflammation of the jawbone. Cases were observed in 1945, 1952 and 1958. The incidence varied from 2% to 8%. There was no apparent relation to soil type and no specific bacterial agent was demonstrated.—M.G.G.

I. Corticelli, B. (1959). Ricerche sull'ascite degli animali domestici. Nota riassuntiva sull'ascite sperimentale dell'ovino ottenuta con il metodo di McKee. [**Ascites in domestic animals. Experimental ascites in sheep.**]—*Atti Soc. ital. Sci. vet.* 13, 620-625. [Summaries in French and German.] 3686

II. Canu, B. & Corticelli, B. (1959). Ricerche sull'ascite degli animali domestici. Nota I. Il metodo di Ferranini applicato all'ovino per la provocazione della ascite sperimentale. [**Ascites in domestic animals. I. Experimental ascites in sheep by Ferranini's method.**]—*Ibid.* 625-628. [Summaries in French and German.] 3687

I & II. The technique described by McKee (ligature of the intrathoracic posterior vena cava) for the production of ascites was applied to 3 sheep. Two developed ascites and one of them died 14 days after treatment. The manifestations were the same as in dogs but, in the survivor, resorption occurred earlier. The negative result in the third animal is discussed.

The technique described by Ferranini (intrajugular injection of large quantities of normal saline soln. followed by injection of histamine) was applied to 3 sheep. Ascites did not develop in any of the animals; there was diminution in blood protein levels and in the specific gravity of the urine.—T.E.G.R.

Light, F. W., Jr. (1960). **Pigmented thickening**

of the basement membranes of the renal tubules of the goat ("cloisonné kidney").—*Lab. Invest.* 9, 228-238. 3688

A kidney condition, named "cloisonné" kidney, peculiar to white Angora goats from Texas but not from other parts of the U.S.A., was described. It resembled a condition previously described in Iraq, possibly associated with cobalt deficiency [*V.B.* 28, 1865]. It was present in 96 of 412 castrated male goats, which had two years previously been used in research on traumatic injury due to missiles. Association, however, of the condition with these experiments was thought to be unlikely. There were no apparent clinical symptoms. In nine goats lesions were severe, in 14 moderate and in 73 slight, characterized by dark-brown pigmentation, thickening of the basement membranes of the convoluted parts of the proximal tubules and accompanied in the majority by haemosiderosis of the renal cortex.—E.G.

Reichel, K. (1960). Klinische Untersuchungen zur Oedemkrankheit des Schweines. [**Clinical research on oedema disease in pigs.**]—*Dtsch. tierärztl. Wschr.* 67, 346-348. [Summary in English.] 3689

In spite of variations in the clinical picture of oedema disease, examination of the blood revealed signs of salt and water retention in both sick and convalescent pigs and in the majority of clinically normal pigs in affected herds. Drugs such as cortisone that favour sodium retention are contra-indicated.—M.G.G.

Bianchi, E. (1960). Morte del cuore enzootica dei suini. [**Fatal syncope of swine.**]—*Vet. ital.* 11, 261-279. [Summaries in English, French and German.] 3690

The disease was observed, during 6-7 years, in about 100 pigs aged 3-6 months (30-70 kg. live weight), fed cereal meal, bran and middlings but not potatoes. Findings are described and compared with those of other workers; differential diagnosis is discussed. Treatment of survivors consisted in a change of diet and the addition of yeast.—T.E.G.R.

I. Sergeeva, T. Y., Tsaregradskaya, N. A., Popov, V. I., Antonova, M. E., Pavlovich, L. A. & Sakharova, R. M. (1960). [**The infectious nature of porcine atrophic rhinitis.**]—*Veterinariya, Moscow* 37, No. 4 pp. 38-44. [In Russian.] 3691

II. Tsion, R. A. & Ubran, V. P. (1960). [**Aetiology of porcine atrophic rhinitis: role**

of yeasts.]—Ibid. No. 7 pp. 31-33. [In Russian.] 3692

III. Il'ina, Z. M. (1960). [Aetiology of porcine atrophic rhinitis: role of a coccobacillus.]

—Ibid. No. 7 pp. 33-35. [In Russian.] 3693

I. The disease was produced in 23 piglets aged 7-10 days (plus 6 uninfected controls) from 3 litters by intranasal instillation of 1 ml. of 1:20 aqueous suspension of nasal mucosa from clinical cases. Illness (sneezing, nasal discharge) developed within 17 days of inoculation. Typical histological changes were found when the piglets were killed between 10 and 13 days after inoculation. In two pigs killed after 30 days there were intranuclear inclusions like large dark nuclei surrounded by a clear zone, in cells of epithelial glands of the mucosa of turbinate bones.

The infective agent was passaged in chick embryos aged 8-10 days by inoculating into the yolk sac or onto the chorioallantoic membrane 0.2 ml. of centrifuged 10% suspension of nasal mucosa treated with streptomycin and penicillin. Passage was done after 5-6 days' incubation. Oedema of the chorioallantois was encountered; embryos hatched alive but weak. Atrophic rhinitis was reproduced by inoculating into 6 piglets aged 8 days a suspension of chorioallantoic membrane or embryonal fluid from the first egg passage.

II. At Leningrad veterinary institute the authors isolated a yeast by sowing onto Sabouraud's medium preparations of turbinate bones from affected pigs. Cultures of the sixth generation were introduced onto the scarified nasal mucosa of two healthy piglets and both developed atrophic rhinitis, confirmed P.M. a month after inoculation. The possibility of presence of virus in the yeast cells was discussed: the authors claimed that it was eliminated by using 6th-generation cultures for experimental infection.

III. At the Siberian veterinary research institute the nasal microflora of 45 affected and 60 apparently healthy pigs was studied. The author's attention was drawn to an "encapsulated mucilaginous coccobacillus" that was isolated from 43 of the 45 affected pigs. In smears the organism was found in groups of 20 or more. Mice inoculated s/c with washings of nasal mucosa from healthy pigs remained healthy, but some inoculated with washings from affected pigs died and from them the coccobacillus was isolated in pure culture. The organism was polymorphous, not motile, and Gram-negative, and

grew well on ordinary nutrient media under aerobic and anaerobic conditions. It resembled *Klebsiella*.

Some mice died 14-60 hours after s/c inoculation of culture but those that lived for 4-50 days developed clinical and pathological signs of rhinitis. Affected mice transmitted the disease to healthy mice in contact. 16 piglets aged 5-7 days were infected by oral, intranasal or subconjunctival administration of cultures of the coccobacillus. After 7-10 days all had fever and were sneezing. Cultures of nasal mucosa from two pigs 10 days after infection yielded coccobacilli in one case. Deformation of the nose occurred in 3 of the piglets after 6-8 weeks; one was killed and the coccobacillus was isolated from the nose.

—R.M.

Corticelli, B. (1960). L'ascite del cane. [Ascites in the dog.]—Vet. ital. 11, Suppl. No. 5 pp. 163-258. 3694

This monograph includes personal observations and carries an extensive list of references.—T.E.G.R.

Arskii, K. T. & Reznichenko, L. P. (1958). [Production of epileptiform states in dogs by means of a conditioned reflex.]—Sborn. Trud. Kharkov. Vet. Inst. 23, 105-108. [In Russian.] 3695

An electric shock of 120 volts applied for 2-3 sec. through the brain caused an epileptiform state. When a bell was rung at the same time as the shock, dogs eventually reacted to the bell alone with the following syndrome; increased respiration and pulse, salivation, involuntary urination and defaecation, dilated pupils, muscle tremors, defensive stance. Such a conditioned reflex became firmly established in adult dogs.—R.M.

Leinati, L., Mandelli, G. & Carrara, O. (1959). Lesioni cutanee nodulari nelle lepri della pianura padana. [Nodular lesions in the skin of hares in Italy.]—Atti Soc. ital. Sci. vet. 13, 429-435. [Summaries in English and French.] 3696

A skin disease of hares in the Po valley is described. It occurs in late summer and autumn and is characterized by nodules (varying in size from a pea to a walnut) on the ears, eyelids, hind legs and fore legs (in diminishing order of frequency). The nodules are of a rubbery consistency and, in advanced cases, the surface becomes necrotic and ulcerated; on section recent lesions are shiny

reddish grey while older ones are pale grey. The histology is described. The causal agent was not identified but the disease was transmitted experimentally to hares and rabbits by

inoculation of nodule suspension. It is considered that the condition is not myxomatosis but the two diseases may be related.

—T.E.G.R.

POISONS AND POISONING

Halaša, M. & Ferenčík, M. (1960). Priemyselná fluoróza hospodárskych zvierat. [**Industrial fluorosis in farm animals.**]—Vet. Čas. 9, 47-55. [In Slovak. Summaries in English, French, German and Russian.] 3697

An account of industrial fluorosis in livestock, which presents a problem of growing importance in certain regions of Slovakia, to which, so far, no real solution has been found.

—E.G.

Suttie, J. W. & Phillips, P. H. (1960). **Studies of the effects of dietary NaF on dairy cows. IV. Dental changes as the result of long-term fluorine ingestion.**—J. Nutr. 71, 109-114. [Authors' summary modified.] 3698

The distribution of fluorine in the enamel and dentin of cows exposed to high levels of dietary fluorine for 8 years was studied. Dentin from control cows contained less than 1,000 and enamel less than 500 p.p.m. of fluorine.

The amount of F in the dentin, much like bone, increased with added increments of dietary F and with duration of exposure; it increased from the first to the 4th incisor, indicating a more rapid accumulation in younger osseous structures.

Fluorine increased in enamel only if the teeth had not erupted prior to exposure.

Incisors which were in the formative stage developed typical dental fluorosis. But teeth changes were quite variable and should not be used alone as a definite index of fluorine toxicosis.

Herman, M. A. & Wiktor, T. J. (1960). Sur la recherche de l'arsenic dans les intoxications du bétail. (Interprétation des résultats chez les animaux dipsés à l'arsenic). [**Arsenic content of the hair and organs of cattle dipped in arsenical solutions.**]—Bull. agric. Congo belge 51, 403-416. [In French. Summary in Flemish.] 3699

The liver and kidney of 12 cattle that had been dipped regularly in arsenical solutions contained 0.3-1.8 (average 1.28) mg./kg. The hair of 5 such cattle contained 320-750 mg./kg. The liver and kidney of cattle, sheep and pigs that had not been dipped

in arsenic contained up to 0.4 (average 0.29) mg./kg., and of cattle that had died from arsenical poisoning 10-73 mg./kg.—M.G.G.

Kovács, J., Bálintffy, I. & Schink, Z. (1960). Vizsgálatok a sertés-methaemoglobinaemia oktanára és gyógyítására vonatkozóan. [**Aetiology and treatment of methaemoglobinaemia in pigs.**]—Mag. állator. Lapja 15, 216-222. [In Hungarian. Summaries in English and Russian.] 3700

Aetiological factors are discussed, based on a review of the literature and on the authors' own studies. The condition is described: pale skin, dyspnoea and asphyxia are the most characteristic signs and dark brown blood and dilated mesenteric vessels as the main P.M. features. The relative importance of asphyxia, due to a rise in the methaemoglobin content of the blood to 70%, and circulatory collapse, due to splanchnic vasodilatation, is discussed.

Nitrites and nitrates, in drinking water and food, are primarily incriminated in aetiology. In pigs weighing 20-30 kg. an average dose of 120 mg./kg. of sodium nitrite increased the methaemoglobin content of the blood to 70%. However, it was calculated that up to 60% of the above dose is contained in the daily water ration normally consumed by pigs and experiments showed that up to 40% of the nitrates could be reduced to nitrites by various bacterial cultures *in vitro*. It was concluded that drinking-water may not be solely responsible for the condition, and analyses of food substances were carried out. Mangolds particularly had a high nitrate content. On the other hand, gastric lavage and the administration of sodium bicarbonate solution before administering 80 mg./kg. sodium nitrate to pigs increased the blood methaemoglobin from an average of 47% to a lethal concentration. As sodium bicarbonate injected *i/v* had no such effect it was assumed that deficiency of hydrochloric acid (dyspepsia) may increase the quantity of the nitrites in the stomach.

The role of the nettle and its component, formic acid, was also investigated, with negative results.

Of various reducing substances tested for treatment, 1% methylene blue solution was the most effective. Adrenaline was of little practical value for controlling the splanchnic vasodilatation. Further work is to be published in *Acta vet. Acad. Sci. hung.*

—A. SEBESTENY.

Raiha, N. (1960). Effects of ethanol on cyto-logical changes induced by salt load in nucleus supraopticus of rat.—*Proc. Soc. exp. Biol., N.Y.* 103, 387-389. [Author's summary modified.] 3701

Administration of ethanol to rats replete with hypertonic salt solution increased urine flow and prevented degenerative changes in ganglion cells of the supraoptic nucleus.

Leahy, J. S. & Waterhouse, C. E. (1960). The quantitative determination of low concentrations of warfarin in aqueous solution.—*Analyst* 85, 492-494. [Authors' abst.] 3702

Previous methods for detecting 3-(α -acetylbenzyl)-4-hydroxycoumarin in tissues or body fluids have been qualitative only. A procedure is described by which concentrations greater than 6.6 μ g per ml can be quantitatively determined in standard solutions.

Rosenberger, G. & Heeschen, W. (1960). Adlerfarn (*Pteris aquilina*)—die Ursache des sog. Stallrotes der Rinder (*Haematuria vesicalis bovis chronica*). [Bovine chronic haematuria associated with bracken poisoning.]—*Dtsch. tierärztl. Wschr.* 67, 201-208. [Summary in English.] 3703

The daily ration of 5 cattle was supplemented with 2-3 kg. of green bracken or 1.7 kg. of naturally dried bracken. All developed haematuria 13-15 months later. One died from anaemia 10 weeks after symptoms began, the other 4 died in 2-4 weeks with high fever and complete loss of appetite. P.M. examination revealed general haemorrhagic diathesis in these 4, and all 5 had changes in the urinary bladder similar to those in bovine chronic haematuria. It was concluded that chronic bracken poisoning is the cause of this disease. [There is no mention of any controls.]

—M.G.G.

Brown, J. M. M. (1959). Advances in "Geeldikkop" (*Tribulosis ovis*) research. 2.—Field investigations—the mobile laboratory and experimental facilities. 3.—The epizootology of "Geeldikkop".—*J. S.Afr. vet. med. Ass.* 30, 395-401 & 403-417. [Author's summary modified.] 3704

A brief description of the mobile laboratory used in recent field studies on Geeldikkop, its potentialities and some of the organization of such investigations is presented. Apparatus for the collection of urine and bile is briefly described.

Some of the features of the epidemiology of "Geeldikkop" are presented. Its seasonal occurrence and geographical distribution are discussed. Information concerning *Tribulus terrestris* and other suspected plants is given. The toxicity of *Tribulus* under various conditions is discussed. The incidence of the disease in small ruminants with regard to breed, sex and age is reviewed and some thoughts advanced as to why the disease is usually seen chiefly in young animals and the finer breeds of sheep and goats. The close relationship between "Geeldikkop" and Enzootic Icterus is noted and some indication of the economic importance of the disease is given.

Allen, J. R., Childs, G. R. & Cravens, W. W. (1960). *Crotalaria spectabilis* toxicity in chickens.—*Proc. Soc. exp. Biol., N.Y.* 104, 434-436. 3705

Numerous deaths occurred in several large laying flocks characterized by ascites and haemorrhage in the liver. At first poisoning by either toxic fat, sodium chloride, or creosote was suspected but these were negated by feeding trials and chemical analyses. Seeds of *Crotalaria spectabilis* were seen in the foodstuffs and an experimental study of the toxicity of *C. spectabilis* for young broiler chickens was made.

From 0.05% up to 5.0% of the seeds were added to broiler rations and fed to chicks. All levels produced retardation of growth and levels over 0.3% produced 100% mortality in the experimental chickens within 18 days. Ascites was present in all those that died. The liver was markedly reduced in size, light tan and frequently covered by coagulated exudate. Petechial haemorrhages were present in the liver and lungs. Cirrhosis was not observed.

Pallotta, A. J. & Koppanyi, T. (1960). The use of ion exchange resins in the treatment of phenobarbital intoxication in dogs.—*J. Pharmacol.* 128, 318-327. 3706

Dogs were successfully resuscitated from acute poisoning with phenobarbitone sodium (150 mg./kg. body wt.) by passing their blood through a resin column (containing "Dowex 1-X4").—R.M.

Tusing, T. W., Paynter, O. E. & Opdyke, D. L. (1960). **The chronic toxicity of sodium alkylbenzenesulfonate by food and water administration to rats.** — *Toxicol. appl. Pharm.* 2, 464-473. 3707

This widely-used detergent was given to rats in the food at concentrations of 0.1% and 0.5% for two years. No evidence of toxicity was found.—R.M.

Oser, B. L. & Oser, M. (1960). **2-(p-tert-Butylphenoxy) isopropyl 2-chloroethyl sulfite (Aramite).** I. Acute, subacute, and

chronic oral toxicity.—*Toxicol. appl. Pharm.* 2, 441-457. 3708

Aramite is used as a spray against mites on fruit and other crops. In rats and g.pigs the acute lethal dose averaged 3.9 g./kg. body wt. It caused haemorrhages, particularly in the lungs. Dogs could not be poisoned with this dosage because it caused vomiting. When fed in the food at a conc. of 500 p.p.m. to rats and dogs for 3 months it appeared to have little harmful effect, but 1,580 and 5,000 p.p.m. caused liver damage including neoplasia.

—R.M.

PHARMACOLOGY AND GENERAL THERAPEUTICS

(For treatment of specific infections see under the appropriate disease)

Snair, D. W. & Schwinghamer, L. A. (1960). **The effect of 2-amino-5-nitrothiazole (Enheptin) on fertility, organ weight, body weight, oestrous cycle, and pituitary hormones in the rat.**—*Toxicol. appl. Pharm.* 2, 418-429. 3709

Aminonitrothiazole was mixed with the food in a conc. of 0.1% for 10 days. It had a stilboestrol-like action similar to that discovered in experiments on fowls [Hudson & Pino, *Poult. Sci.* 31, 1017 (1952)].—R.M.

Dozza, G. & Torlone, V. (1959). **Preparazione, conservazione e impiego di plasma canino. [Preparation, preservation and use of canine plasma.]** — *Atti Soc. ital. Sci. vet.* 13, 182-187. [Summaries in English and French.] 3710

The technical and clinical aspects of plasma transfusion are described and discussed; freeze drying is considered the most satisfactory method of preservation of canine plasma.—T.E.G.R.

Galligani, G. (1960). **Alcuni tentativi di terapia tissulare in medicina veterinaria. [Tissue therapy in domestic animals.]**—*Veterinaria, Milano* 9, 49-50. 3711

Tissue therapy with extract of placenta injected s/c was applied to 2 mules with chronic pulmonary emphysema and 2 with "rheumatism". Some improvement was observed in one mule with rheumatism but not in any of the others. Satisfactory results are claimed in the treatment of chronic open wounds, fistulous withers, and endometritis in a cow.—T.E.G.R.

Zaimis, E. (1960). **Parallelism of changes produced by cooling and by drugs known to affect adrenergic mechanisms.** — *Nature*,

Lond. 187, 213-216. [Author's summary modified.] 3712

Reserpine, guanethidine, bretylium, tyramine, amphetamine, ephadrine and dichloroisoprenaline produce changes closely analogous to those in animals whose body temperature has been lowered. The metabolic basis of these changes is discussed.

Adams, A. & ten others. (1960). **Sulphasomizole (5-p-aminobenzenesulphonamido-3-methylisothiazole): a new antibacterial sulphonamide.** — *Nature, Lond.* 186, 221-222. 3713

A new sulphonamide—*isothiazole*, a hitherto unknown heterocyclic nucleus—is reported. The name sulphasomizole has been approved by the British Pharmacopoeia Commission. The synthetic processes involved are described. The compound was tested *in vitro* and *in vivo*. Results indicate that it is a useful therapeutic agent with an all-round antibacterial spectrum. It is well absorbed and distributed in the body, is readily excreted in the urine, and does not produce crystalluria, even in high dosage, in experimental animals. The sodium salt is highly soluble in water and well tolerated on injection. Clinical studies are in progress.—T.E.G.R.

Anton, A. H. (1960). **The relation between the binding of sulfonamides to albumin and their antibacterial efficacy.** — *J. Pharmacol.* 129, 282-290. 3714

Sulphonamide bound to blood albumin was devoid of antibacterial activity, but the degree of binding varied greatly in different species. In the case of sulphadiazine 24% was bound by bovine plasma, 17% by dog, 13% by cat, 16% by fowl, 45% by rat, 7% by

mouse, 55% by rabbit. In the case of sulfoxazole (sulphafurazole) the respective figures were 76, 65, 43, 5, 84, 7 and 55%. Other compounds studied were sulphamethoxypyridazine and sulphaethylthiadiazole. It may be possible to prevent plasma binding by prior administration of phenylbutazone.

—R.M.

Kuck, N. A. & Redin, G. S. (1960). **Comparison of demethylchlortetracycline with tetracycline in the control of experimental infections in mice.**—J. Pharmacol. 129, 350-355. 3715

Tested on *Staph. aureus*, *Str. pyogenes*, *Str. pneumoniae*, *Klebsiella pneumoniae* and *Past. septica* infections demethylchlortetracycline was equal, and in some cases superior, to tetracycline.—R.M.

Boyd, C. E. (1960). **The acute oral toxicity of benzylpenicillin potassium in the rabbit.**—Antibiot. & Chemother. 10, 376-384. [Summary in Spanish p. 392. Author's summary modified.] 3716

The acute oral lethal dose of benzylpenicillin potassium in the rabbit was 5.25 ± 0.87 g./kg. body wt. Death occurred after an hour in most rabbits and within 5 to 30 days in the remainder.

The syndrome in rabbits dying at one hour consisted of anorexia, adipsia, and frequency of urination, followed by a decreased respiratory rate, pallor, prostration, and hypothermia. Irritability and increased locomotor activity immediately preceded death, which was due to respiratory failure and cardiovascular shock. The syndrome in animals dying at 5 to 30 days was characterized by anorexia, adipsia, oliguria, weight loss, diarrhoea, lassitude, and hypothermia.

Rabbits surviving benzylpenicillin potassium presented signs similar to those of animals dying at 5 to 30 days except that body weight did not fall and began to rise after five days. Food intake and colonic temperature were normal after 14 days, while oliguria and adipsia persisted. Glycosuria, haematuria, and lowered urinary pH were observed.

The pathological picture at death five days after administration comprised acute gastroenteritis, renal tubular necrosis, and renal haemorrhage, and interstitial pulmonary oedema. Slight lesions were present in skeletal muscle and liver.

I. Maynert, E. W. (1960). **The usefulness of clinical signs for the comparison of intra-**

venous anesthetics in dogs.—J. Pharmacol. 128, 182-191. 3717

II. Maynert, E. W. & Klingman, G. I. (1960). **Acute tolerance to intravenous anesthetics in dogs.**—Ibid. 192-200. 3718

I. M. compared the effect of pentobarbitone sodium, thiopentone sodium, trichlorethanol, paraldehyde and ethanol on the following reflexes: wink, corneal, swallowing, endotracheal, patellar, respiratory, movement, head-righting; also spontaneous movement, walking and freedom from ataxia. Five levels of anaesthesia were defined. Special attention was paid to the time taken for ataxia to disappear: ethanol and paraldehyde acted like thiopentone in this respect and M. therefore questioned the theory that the brief action of thiopentone was due to affinity for fat.

II. Tolerance was defined as resistance to a conc. of drug in plasma which under other conditions had pharmacological effects. The term acute implied that tolerance developed during a single dose or during repeated doses given within a few hours. The same five anaesthetics resembled each other fairly closely in that the maximum tolerated dose was five times the median dose needed to produce ataxia. There was rather less tolerance to pentobarbitone and paraldehyde than to the other drugs. Anaesthetics could be given at weekly intervals without tolerance increasing.

—R.M.

Goldstein, A. & Aronow, L. (1960). **The duration of action of thiopental and pentobarbital.**—J. Pharmacol. 128, 1-6. 3719

The brief action of intravenously injected thiopentone sodium compared with pentobarbitone sodium was due to the more rapid fall in brain concentration. Its high solubility in lipids explained the rapid equilibration of brain and serum concentrations. (The experiments were done on rats.)—R.M.

Bellville, J. W., Fennel, P. J., Murphy, T. & Howland, W. S. (1960). **The relative potencies of methohexital and thiopental.**—J. Pharmacol. 129, 108-114. 3720

The new short-acting anaesthetic methohexital is 1-methyl-5-allyl-5-(1-methyl-2-pentynyl) barbituric acid. Used on four dogs it proved to be three times as potent as thiopentone.—R.M.

Lascelles, A. K. & Claringbold, P. J. (1960). **The effects of suture materials and suture techniques on the healing of wounds in the**

skin of the sheep.—Aust. J. exp. Biol. med. Sci. 38, 111-115. [Authors' summary modified.] 3721

Braided polyester yarn, braided silk, monofilament nylon, plain catgut, and "Vetafil" were used to suture skin wounds. The apposition of the edges of the wound, the gauge of the suture material, the tension of the sutures and the dressing were varied. The

strength of the wound was used to assess the effect of these factors. No significant differences were found with the exception that very closely spaced sutures caused a significant decrease in the strength of the wounds. The inflammatory response caused by the suture materials was examined histologically. The response varied considerably, but no difference between the various materials could be seen.

See also absts. 3460 (resistance of *B. anthracis* to antibiotics); 3463 (erythromycin in exp. anthrax); 3477 (dapsone and penicillin in summer mastitis prophylaxis); 3485 (chloramphenicol in exp. past urellosis); 3500 (susceptibility of *Salmonella* to kanamycin); 3523 (leptospirosis); 3547 (absorption of prothidium by *Trypanosoma rhodesiense*); 3549 (anticoccidial drugs); 3557 (spiramycin in experimental toxoplasmosis); 3558 (F. & M. disease); 3574 (mepacrine in equine encephalitis in mice); 3611, 3613-3614 & 3616-3618 (parasitides); 3617-3621, 3623, 3632, 3634, 3638 & 3641-3643 (anthelmintics).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

Zhuravel, A. A. (1960). [Physiology of farm animals.] pp. 328. Moscow: Gosud. izdatel'stvo sel'skokhoz. literatury. 6r. 35k. [In Russian.] 3722

A Russian textbook for students of veterinary science and animal husbandry. As would be expected, it leans heavily on the teachings of I. P. Pavlov. The book costs 7s. 6d. in the U.K.—R.M.

Turner, H. G. & Schleger, A. V. (1960). **The significance of coat type in cattle.**—Aust. J. agric. Res. 11, 645-663. [Authors' summary modified.] 3723

A system of subjective scoring of cattle coats, ranging from very sleek to very woolly, is described. It has been applied to about 1,600 animals, of which 500 were Hereford and Shorthorn cows and the rest their progeny from matings in four years to British breed and zebu bulls. Highly significant differences between animals of the same breed persist through different seasons. Effects of season, age and sex are described. Coat scores are well correlated with body temperatures and respiration rates. Coat score and post-weaning growth rate of British breed calves are correlated to such a degree that coat score can be superior to a record of body weight as an estimate of growth capacity. The genetic correlation between coat score and growth rate is high in the British breeds. Evidence of the relation between coat score and growth rate in zebu cross calves is inconclusive.

The results indicate the potential value of coat characters in selecting tropical beef cattle. The degree to which these results may be applicable to other populations in other environments is discussed. It is concluded that a sleek coat is important in favouring heat dissipation, but it may have even greater

significance as an indicator of metabolic efficiency or of capacity to react favourably to stress.

Brook, A. H. & Short, B. F. (1960). **Sweating in sheep.**—Aust. J. agric. Res. 11, 557-569. [Authors' summary modified.] 3724

Water loss from the sweat glands of shorn sheep was estimated as the difference between the average weight gain of desiccating capsules placed on 10 normal sheep and on 4 control sheep congenitally lacking sweat glands. At an air temperature of 20°C. (68°F.) and a water vapour pressure of 12.5 mm. Hg the rate of sweating was 10.2g./sq.m./hour, and at 40°C. (104°F.) and a water vapour pressure of 28.1 mm. Hg the rate of sweating was 32.1g./sq.m./hour. The maximum amount of heat a sheep could lose by sweating at the rate of 32g./sq.m./hour under these conditions is about 20 kcal./hour.

It is emphasized that the rate of sweating observed in shorn sheep must not be applied unreservedly to sheep with a fleece.

Debackere, M. & Peeters, G. (1960). Le mécanisme de l'éjection du lait par distension vaginale chez le mouton. [Mechanism of ejection of milk by vaginal distension in the ewe.] — Arch. int. Pharmacodyn. 126, 486-488. 3725

The jugular veins were joined in two ewes lying side by side. Vaginal distension in one ewe caused increase in pressure in the udder of the other ewe.—R.M.

Pickford, M. (1960). **Factors affecting milk release in the dog and the quantity of oxytocin liberated by suckling.**—J. Physiol. 152, 515-526. [Author's summary modified.] 3726

Simultaneous observations on milk release

and urine flow were made on three bitches during lactation.

Puppies made the greatest weight gain on being suckled after i/v inj. of 15–20 m-u. (milliunits) of oxytocin during the first 3 weeks of lactation. Voluntary milk release was accompanied by an antidiuresis which could be matched by the i/v inj. of 0.1–0.5 m-u. vasopressin.

Intracarotid injection of either a solution of acetylcholine or of hypertonic NaCl caused milk ejection. I/v inj. of 1 µg. adrenaline immediately before an injection of oxytocin or acetylcholine wholly prevented the milk ejection response.

Locatelli, A. & Quarenghi, F. (1959). Comportamento del glicogeno leucocitario nei primi giorni di vita del bovino. [**Glycogen content of leucocytes in the new-born calf.**]—Atti Soc. ital. Sci. vet. 13, 401–404. [Summaries in English and French.] 3727

The glycogen content of neutrophile leucocytes of calves was higher at birth than at 7 days or at adult age.—T.E.G.R.

Prystowsky, H., Meschia, G. & Barron, D. H. (1960). **The oxygen tension in the placental bloods of goats.**—Yale J. Biol. Med. 32, 441–448. [Authors' summary modified.] 3728

During the last half of gestation the oxygen tension in the maternal arterial blood ranges from 74 to over 90 mm. Hg. In the uterine vein the oxygen tension varied from 38.2–54.0 mm. Hg. On the foetal side the oxygen tension ranged between 20.3–45 mm. Hg. in the umbilical vein and 10.4–18.5 in the umbilical artery. These foetal values were compared with those obtained from three cases in which the arterial blood of the dam was poorly oxygenated.

Bigland, C. H. & Triantaphyllopoulos, D. C. (1960). **A re-evaluation of the clotting time of chicken blood.**—Nature, Lond. 186, 644. 3729

When blood was withdrawn by venepuncture using No. 20 siliconized-B-D "Vacutainer" needles only, thus ensuring minimum trauma to the vein, the clotting time ranged from 13–180 min. Additions of chicken brain thromboplastin and thrombin reduced this interval. It was concluded that the chicken clotting mechanism relies on tissue rather than plasma thromboplastin and that the shorter clotting time observed by others may have been due to the action of vein wall thromboplastin.—J. E. HAMMANT.

Reid, C. S. W. & Cornwall, J. B. (1959). **The mechanical activity of the reticulo-rumen of cattle.**—Proc. N.Z. Soc. Anim. Prod. 19, 23–35. 3730

The activity of the reticulo-rumen was recorded by measuring the vertical height of the different structures relative to a fixed external point. Realizing the limitations of the method, two basic sequences of activity associated with mixing the contents and the eructation of gas are described. Feeding resulted in an increase in frequency of the cycles which paralleled the rate of food intake and which afterwards decreased in intensity. During rumination only the mixing cycles appeared abbreviated and when rumination stopped a period of quiescence followed, often lasting several minutes.—J. E. HAMMANT.

Pedini, B. & Moretini, B. (1959). Variazione della motilità del rumine nel bovino dopo inoculazione di glucosio per via endovenosa. [**Changes in rumen motility in cattle after intravenous injection of glucose.**]—Atti Soc. ital. Sci. vet. 13, 554–559. [Summaries in English and French.] 3731

Pedini, B. & Comodo, N. (1959). Variazioni della motilità del rumine nel bovino dopo inoculazione endovenosa di calcio. [**Changes in rumen motility in cattle after intravenous injection of calcium.**]—Ibid. 560–565. [Summaries in English and French.] 3732

Abbate, A., Molinari, P. & Santus, L. (1959). Contributo allo studio della motilità del rumine nei bovini, in rapporto al tasso ematico degli idrati di carbonio. [**Rumen motility in relation to blood carbohydrates in cattle.**]—Ibid. 657–660. [Summaries in English and French.] 3733

I. Rumen motility in cattle was reduced by i/v injection of glucose.

II. Rumen motility in cattle was reduced by i/v injection of therapeutic doses of calcium gluconate or chloride.

III. Rumen motility decreased as the carbohydrate (especially lactose) content in the blood increased. It is considered that lactose may be of value in the treatment of traumatic peritonitis by restricting movement of the foreign body and allowing tissue repair to take place.—T.E.G.R.

Hungate, R. E., Phillips, G. D., Hungate, D. P. & MacGregor, A. (1960). **A comparison of the rumen fermentation in European and zebu cattle.**—J. agric. Sci. 54, 196–201. 3734

The rate of rumen fermentation was

studied in eight zebu and eight mixed breed European cattle. In experiments 1 and 3 four cattle of each breed were fed grass hay. This was given *ad libitum* in experiment 1, but later in experiment 3 it was slightly restricted and the animals were kept in crates. In experiment 2 eight animals were fed lucerne hay *ad libitum*. Rumen samples were removed by stomach tube and the fermentation products determined as acid CO_2 and methane. The rumen fermentation rate per unit solids was greater in the zebu than in the European cattle, it was also greater in animals fed lucerne than those fed grass hay. Fermentation rates tended to be greatest where weight gains were the best.—E. J. CASTLE.

Abdel-Raouf, M. (1960). **The postnatal development of the reproductive organs in bulls with special reference to puberty. (Including growth of the hypophysis and the adrenals).**—Acta endocr., Copenhagen Suppl. No. 49 pp. 109. [In English.] 3735

The study was carried out on 103 young bulls of the Swedish Red and White breed, including 14 pairs of twins (6 identical and 8 fraternal). No evidence was obtained that growth rates of endocrine glands and genital organs were influenced by genetic factors. From birth to 20 weeks of age, the left adrenal was consistently heavier than the right, while the paired genital organs on the right side were heavier than those on the left. Spermatogonia appear in the testicles by the 8th week, primary spermatocytes by 20 weeks and spermatozoa by about the 30th week, by which time Sertoli cells were apparent. Under-nutrition delayed spermatogenesis. Stages in development are described for the epididymis, seminal vesicles (fructose and citric acid present at birth, greatly increased after 20th week), and penis where the separation from the prepuce starts at 4 weeks and is normally complete at 32 weeks, but on low level feeding not until the 40th week.—F. L. M. DAWSON.

Silver, M. (1960). **The output of adrenaline and noradrenaline from the adrenal medulla of the calf.**—J. Physiol. 152, 14-29. [Author's summary modified.] 3736

The pressor amine content and secretory capacity of the adrenal gland were determined in calves aged from 3 hours to 220 days, and in pregnant and non-pregnant cows 2-3 years old.

In the calves the percentage of adrenaline in the glands rose with age from 51 to 75%, while 77% was found in the adult. The total

adrenaline per gland rose sharply from about the tenth day of life, while the noradrenaline content remained constant during the period investigated.

The anomalies in the development of adrenal medullary function in the calf are discussed, and a hypothesis is advanced which could explain many of the discrepancies between output of adrenaline and noradrenaline during nerve stimulation and acetylcholine injection, and the glandular concentrations of these amines.

Robinson, K. W. & Morris, L. R. (1960). **Adrenal cortical activity in sheep as measured by urinary 17-ketogenic steroid excretion.**—Aust. J. agric. Res. 11, 236-246. 3737

The effects of a number of stimuli on adrenal activity in sheep were assessed from measurements of urinary 17-ketogenic steroids (17-KGS). Injections of ACTH produced a marked rise in the excretion of these steroid metabolites.

A seasonal rhythm which appears to be temperature induced, was observed in the 17-KGS excretion, the peak output being in winter. In pregnant ewes there is a sudden drop in urinary 17-KGS two weeks before lambing and this also occurs in pregnant ewes undergoing ACTH therapy. There was a progressive rise in excretion after parturition, which was dependent on lactation.

Pregnancy appears to modify the response to repeated injections of ACTH. The steroid excretion rate was related to the ACTH dosage in pregnant and non-pregnant ewes, but gestation reduced the total output. There was no evidence of adrenal atrophy after repeated cortisone injections but endogenous ACTH release was delayed when daily ACTH injections were discontinued.

—A. L. C. WALLACE.

Calaprice, A. (1959). **Indagini sulla presenza di prolattina nelle urine degli animali domestici. Nota preliminare: Controllo delle metodiche adottate e ricerca dell'ormone nelle urine di bovine nel periodo della lattazione. [Prolactin in the urine of lactating cows. Preliminary note.]**—Acta med. vet., Napoli 5, 531-538. [Summaries in English and French.] 3738

Prolactin was demonstrated in the urine of lactating cows by the method described by Segaloff *et al.*—based on changes in the ingluvial epithelium of pigeons injected i/v with an extract of the urine under test.

—T.E.G.R.

Annison, E. F. (1960). **Thyroxine binding in sheep serum.**—*Aust. J. agric. Res.* **11**, 539-547. [Author's summary modified.] 3739

The thyroxine-binding capacities of sheep thyroxine-binding proteins can be conveniently measured by reverse-flow electrophoresis. Values found were within the range 11–16 μ g. thyroxine/100 ml. serum.

Twin ewes were studied, one of each pair being pregnant. No differences could be detected between the patterns of thyroxine binding by the sera of pregnant and non-pregnant sheep maintained under similar conditions.

Culzoni, V. (1959). Di alcune caratteristiche dell'articolazione dell'anca nei bovini. [A **fibro-vascular structure in the coxo-femoral joint of cattle.**]—*Atti Soc. ital. Sci. vet.* **13**, 310-312. [Summaries in English and French.] 3740

A fibro-vascular structure in the acetabulum of cattle is described and its morphological significance discussed.—T.E.G.R.

Yamashita, T. (1959). **Histological studies on the ovaries of sows. I. Histological observations on the five groups of structures found on ovarian surfaces with special reference to hematoxylin-eosin section-preparations.**—*Jap. J. vet. Res.* **7**, 177-202. [In English.] 3741

A detailed description is given of the structures found, with numerous photographs. The material was obtained from animals at the slaughter-house with little of their history known. In addition to the previously reported

See also abst. 3773 (book, anatomy and physiology of the cow's udder).

PUBLIC HEALTH, VETERINARY SERVICES AND VETERINARY EDUCATION

Garner, R. J. (1960). **An assessment of the quantities of fission products likely to be found in milk in the event of aerial contamination of agricultural land.**—*Nature, Lond.* **186**, 1063-1064. 3744

A table gives the estimated activity in cows' milk of I-131, I-133, Te-132, Sr-89, Sr-90, Ba-140 and Cs-137 on the 1st to 10th days and on the 21st day after a total deposition of 1 μ c of individual isotopes per sq. metre of pasture. Without allowing for supplementary feeding, the growth of new grass and the removal of activity by rain, the maximum concentration in the first 21 days is estimated to be 0.16 μ c per litre of milk for I-131, 0.06 for I-133, 0.009 for Te-132, 0.027

structures, yellow spots containing many blood vessels with relatively little degeneration were described and designated "vascular bodies". These were considered to be old corpora lutea of pregnancy.—J. E. HAMMANT.

Danilevskii, V. M. (1960). [Electrophoretic **protein pattern of the serum of pigs.**]—*Veterinariya, Moscow* **37**, No. 5 pp. 41-43. [In Russian.] 3742

Paper electrophoresis was done on sera from 40 healthy piglets aged 2 weeks to 10 months and on 47 piglets with bronchopneumonia. Results are tabulated. In bronchopneumonia there was increase in gamma-globulin and decrease in alpha-globulin.—R.M.

Reich, M. (1960). **Differences in association of corticosteroids with serum proteins of different animal types.**—*Aust. J. exp. Biol. med. Sci.* **38**, 175-186. [Author's summary modified.] 3743

A marked species difference in the capacity of plasma protein fractions to combine with corticosteroids has been demonstrated by the use of C¹⁴-labelled cortisol and corticosterone, and paper electrophoresis methods. Of the five species studied (man, sheep, dog, rabbit, rat), human serum had the highest and sheep serum the lowest capacity for corticosteroid binding.

The findings indicate the complexity of the characteristics of the protein carrier mechanism for steroid hormones in diverse animal species.

for Sr-89, 0.031 for Sr-90, 0.0092 for Ba-140 and 0.48 for Cs-137.—M.G.G.

Durbin, C. G. (1960). **Public health significance of drugs in food.**—*Proc. 63rd Meet. U.S. Livestock Sanit. Ass. San Francisco*, 1959. pp. 255-261. 3745

A review and discussion of legislation on chemical substances in food.—T.E.G.R.

Kocot, M. (1960). **Organizacja służby weterynaryjnej na Węgrzech. [Organization of veterinary services in Hungary.]**—*Med. Wet., Warszawa* **16**, 295-296. [In Polish.] 3746

The veterinary services are controlled by the Ministries of Agriculture, Supply and

State Farming. The Ministry of Agriculture employs most of the veterinary surgeons. The country is divided into 20 administrative districts with 2 veterinary field officers in each responsible for control of infectious diseases, of small slaughterhouses, and for certain types of treatment. Big slaughterhouses are supervised by veterinary surgeons of the Central Board of the Meat Industry. The Ministry of Supply controls the food manufacturing industry, including dairy produce etc., through a Department of Hygiene whose director is a veterinarian responsible to the deputy Minister. The duties of veterinary surgeons of the Ministry of State Farming are not described and K. only mentions that they work along the same lines as their Polish counterparts whose duties have now been discontinued. Diagnostic and research laboratories are available to veterinary surgeons employed by the food industry and food hygiene is given high priority.—M. GITTER.

also units of frontier veterinary service in co-operation with the Ministries of the Interior, Foreign Trade, Railways and Air and Sea Transport. The district (divisional) veterinary laboratories comprise sections of bacteriology, pathology, serology, parasitology and examination of foodstuffs of animal origin; they are responsible to the Sanitary and Veterinary Directorate. All slaughterhouses are under veterinary supervision. Treatment of animals is at veterinary clinics responsible to town and county national councils; it is free only for animals belonging to co-operative farms. State farms have their own veterinary network.

The State Veterinary Service is supplied with drugs by a state pharmaceutical firm; in addition there are 2 veterinary pharmaceutical shops, in Bucarest and Cluj, which supply drugs, disinfectants etc. to public institutions, co-operatives and the general public.

—M. GITTER.

Bohosiewicz, M. (1960). Organizacja służby weterynaryjnej w Rumuńskiej Republice Ludowej. [Organization of veterinary services in Roumania.]—*Med. Wet., Warszawa* 16, 293-295. [In Polish.] 3747

The main divisions of the State Veterinary Service are: (1) The Sanitary and Veterinary Directorate which determines the programme and administers and correlates work between veterinary institutions. (2) The State Sanitary and Veterinary Inspectorate—control and inspection of sanitary and veterinary regulations in state and private organizations and control of veterinary personnel in all Ministries except that of National Defence. (3) The Sanitary and Veterinary Council—advisory work on general veterinary problems and legislation. (4) Veterinary Institutes of Science and Productivity: (a) Institute of Pathology and Animal Hygiene in Bucarest with 3 provincial centres. (b) The Scientific Laboratory for the Control of Biological Products and Veterinary Drugs. (c) Pasteur Institute—production of sera, vaccines and diagnostic reagents. (d) The Central Laboratory for the Control of animal feeding stuffs and food of animal origin. The Field Staff is organized into divisions and sub-divisions. There are

Hindmarsh, W. L. (1960). **Historical records of the veterinary profession in Australia. I. Veterinary education in New South Wales, Section I. 1895-1918.**—*Aust. vet. J.* 36, 205-211. 3748

The history of veterinary education in New South Wales is outlined during the period 1895-1918. In 1895 short courses in elementary veterinary science were commenced at the Sydney Technical College, mainly to provide training for official positions such as stock inspector. The courses lapsed in 1901 but were revived in 1905. A Chair in Veterinary Science was established in the University of Sydney in 1909 as a result of the David Berry Bequest, and the Sydney Technical College course was replaced by one in Animal Husbandry. The Chair was filled by Professor J. D. Stewart, who occupied it for 30 years. The difficulties of both the staff and students are described and an interesting account of their activities is given. The outbreak of war in 1914 was a serious handicap as few new students were enrolled and 15 of the 17 men who graduated in this period enlisted. Members of the staff were also engaged on military service. At the close of war enrolments increased and steady progress was made.—D. F. STEWART.

LIVESTOCK HYGIENE

- I. Junge, H. R., Jørgensen, T. W. & Petersen, H. W. (1960). *Undersøgelser vedrørende ventilering af stalde 1953-1956. [Studies on ventilation of livestock buildings 1953-1956.]* Copenhagen: Landhusholdningsselskabets Forlag, Kr. 32. [Statens Byggeforskningsinstitut Landbrugsbyggeri No. 17.] [In Danish. Summaries in English and German.] 3749
- II. Anon. (1960). *Staldklimaforseg med svin 1957-59. [Studies on piggyery climates 1957-59.]* pp. 60. Copenhagen: Landhusholdningsselskabets Forlag, Kr. 8. [Statens Byggeforskningsinstitut Landbrugsbyggeri No. 18.] [In Danish. Summaries in English.] 3750
- I. This is publication No. 17 of the Danish State Institute for Building Research. It deals with the performance of mechanical ventilators (fans) measured over two years in byres and piggeries on 12 farms. The cost of electric fan ventilation, including depreciation and electricity consumption, was put at 15 øre (1·8d.) per 100 kg. of milk produced or in pig fattening houses 1·30 kr. (1s. 4d.) per pig.
- II. Publication No. 18 of the Danish State Institute for Building Research com-

prises two papers: a description of the piggyery climate laboratory at the Institute, by V. Korsgaard & P. Olufsen (pp. 5-15), and the influence of environmental temperature and humidity on growth, feed utilization and bacon quality of pigs, by M. Moustgaard, P. B. Nielsen and P. H. Sørensen (pp. 17-60). They are in Danish, with English summaries. It was concluded that the optimum air temperature in well ventilated and insulated piggeries lay between 11° and 20°C.—R.M.

van Albada, M., (1960). *Isolatie en ventilatie van slachtkuikenhokken. [Insulation and ventilation of broiler houses.]* — Tijdschr. Diergeneesk. 85, 639-651. [In Dutch. Summaries in English, French and German.] 3751

The author demonstrated the calculation of heat production and ventilation requirements based on metabolism data previously published. The ventilating system should be capable of exchanging 30 times the volume of the house in an hour, although half this rate of exchange should suffice except during summer heat, allowing 10-20 birds per square metre.—R.M.

REPRODUCTION AND REPRODUCTIVE DISORDERS

- Preston, P. T. & Ollerenshaw, J. A. (1960). *The development of artificial insemination in the African areas of the Central Province of Kenya.* — Bull. epiz. Dis. Afr. 8, 45-55. [Summary in French. Authors' summary modified.] 3752

A brief history of the establishment of artificial insemination schemes for cattle in the African Reserves of the Central Province of Kenya, with a fairly detailed account of the types of schemes operating successfully.

- Morrant, A. J. (1960). *Artificial insemination of sheep. III. The mating of an incapacitated ram using artificial insemination.* — Aust. vet. J. 36, 230-232. [Author's summary modified.] 3753

A case has been described where a ram which could not be successfully mated by natural service because of an injury to the penis was mated successfully by artificial insemination. A technique for collecting semen by electrical stimulation is described. Where a 5% lambing had previously resulted

from hand service, mating by artificial insemination produced an 85% lambing rate.

- Lamond, D. R. & O'Brien, J. (1960). *Augmentation of fertility in beef cattle in the New England area.* — Aust. vet. J. 36, 278-280. [Authors' summary modified.] 3754

The majority of beef cows in a group which were empty at the end of the mating period conceived after hormonal synchronization of ovulation and artificial insemination on two consecutive days at the presumed time of ovulation. One-third of another group of cows conceived after similar treatment and only one insemination. Hormonally induced ovulation is discussed in relation to mating methods and studies in infertility in beef cattle.

- Nellor, J. E. (1960). *Control of estrus and ovulation in gilts by orally effective progestational compounds.* — J. Anim. Sci. 19, 412-420. 3755

Oestrus was suppressed in 3 out of 5 gilts given 0·9-1·0 mg. of 17 α -acetoxyprogesterone

and 5 of 6 gilts on 2.0 mg. per lb. body weight, daily, beginning about a week before the next heat was due. 15 gilts received 6-methyl-17-acetoxypregesterone from 11th-16th days of cycle in graded doses. 0.168 mg. did not inhibit oestrus but the next dose level, 0.668 mg. produced complete inhibition, though follicle growth was not fully inhibited below a level of 1 mg.

A dosage of 1.6 mg. of 6-methyl-17-acetoxypregesterone fed for 24 days to 9 gilts at various cycle stages was successful in synchronizing oestrus to 96 hours after treatment ceased, when ovulation appeared normal and regular cycles were resumed.

—F. L. M. DAWSON.

Loy, R. G. (1959). **Some sources of variation in the progesterone content of corpora lutea.** — Dissertation, Wisconsin pp. 58. [Abst. from Diss. Abstr. 20, 2356-2359.] 3756

A chemical method for purifying and estimating progesterone from luteal tissue was developed. Factors like weight of ovary, relative weights of left and right ovaries, had little influence on progesterone content of corpora lutea from gilts. Injection of progesterone (2.2 mg./kg. body wt. on the first day of the oestrous cycle) into heifers led to increased progesterone in the corpora lutea 14 days later. Injection of oestradiol-17beta had no influence on progesterone content.—R.M.

Wodzicka, M. (1960). **Changes in the dilatability of the ovine vagina in relation to oestrus and anoestrus.**—*Aust. J. agric. Res.* 11, 570-575. [Abst. from author's summary.] 3757

An increase in apparent vaginal volume occurs at the time of oestrus. There is little change in volume over the remainder of the oestrous cycle. In anoestrus, the dilatability is less than at any time during the breeding season.

Dickmann, Z. & Noyes, R. W. (1960). **The fate of ova transferred into the uterus of the rat.**—*J. Reprod. Fertil.* 1, 197-212. [Authors' summary.] 3758

Previous experiments demonstrated that a particular developmental relationship was critical in determining whether or not rat ova transferred asynchronously into the uteri of recipient rats would survive to term foetuses. The present experiments were designed to determine the fate of transferred ova, particularly at the time of implantation.

Ova that were 1 day younger than the uterus developed at the usual rate until the 5th

day of pregnancy, but then degenerated rapidly and failed to implant. Ova that were 1 day older than the uterus delayed their development and did not implant until the uterus was ready for the implantation interaction. Neither control ova nor ova 1 day older than the uterus could implant on the 4th or 6th days of pregnancy.

It is postulated that in the afternoon of the 5th day of pregnancy, the ovum and the endometrium having independently attained a specific stage of development, the uterine environment suddenly changes, becoming detrimental to younger ova but stimulating to 5-day blastocysts in such a way that they elicit the decidual reaction, become attached to the endometrial epithelium, and begin the process of implantation.

Glover, T. D. (1960). **Spermatozoa from the isolated cauda epididymidis of rabbits and some effects of artificial cryptorchidism.**—*J. Reprod. Fertil.* 1, 121-129. [Author's summary modified.] 3759

Fourteen adult male rabbits were subjected to unilateral isolation of the tail of the epididymis in the abdomen, with subsequent retention of the organ in an abdominal position. Isolation of the contralateral cauda epididymidis in each rabbit was effected in the scrotum as a control measure. Estimates of the proportion of dead and decapitated spermatozoa as well as the incidence of spermatozoa with coiled tails, at different levels of the tubule distal to the point of isolation, demonstrated a delayed response of so-called mature spermatozoa to the conditions of experimental cryptorchidism. Quantitative assessments of these criteria suggested that spermatozoa in the body of the epididymis are more susceptible to degeneration than those in the tail of the epididymis, but more evidence is required. The results are discussed in relation to previous work on abnormal spermatozoa.

Anon. (1960). **Symposium on hereditary metabolic diseases.**—*Metabolism* 9, 193-292 & 301-399. 3760

A collection of 15 papers. Discussing general considerations, B. H. Landing laid down the following rules for hereditary metabolic diseases (HMD): (1) all hereditary diseases are hereditary metabolic diseases; (2) they result from defects in single genes, with resultant defects in single enzymes; (3) the enzyme defect is a protein abnormality and biochemical abnormalities of other types are

secondary to one of a protein; (4) the basic enzyme defect is present in all cells of the body from the moment of conception; (5) the basic defect must account, directly or indirectly, for all the clinical and biochemical aspects of a HMD, and any biochemical disturbance which cannot do so is not the basic

one. The remaining papers give examples of HMD in human beings, such as hereditary variations in synthesis of serum proteins, chemistry of disease of the central nervous system, thyroid hormone defects, idiopathic infantile hypoglycaemia, and galactosaemia.

—R.M.

See also absts. 3478 (corynebacteria in bull semen); 3654 (nutrition in relation to reproduction in sows); 3761 (effect of storage temperature and age of eggs on hatchability, sex ratio, growth and viability of chicks); 3768 (report, Tanganyika).

ZOOTECHNY

McDonald, M. W. (1960). **Effect of temperature of storage and age of fowl eggs on hatchability and sex ratio, growth, and viability of the chickens.**—Aust. J. agric. Res. 11, 664-672. [Author's summary modified.] 3761

Fertile eggs were stored for from 1 to 7 days in environments controlled at 40°, 60°, or 80°F. and 70% relative humidity. The eggs were then incubated, and incubator clears and dead embryos at 10 and at 17 days, numbers hatched, weight at hatching, sex ratio, weights of pullets at 14 days of age, and deaths were recorded.

Eggs stored at 40° and 60°F. showed no effect of age of egg before incubation on numbers of clears, dead embryos, or chicks hatched, but eggs stored at 80°F. showed a rapid fall in number of chicks hatched.

Fewer chicks were hatched from eggs stored at 40° than at 60° because of a higher number of incubator clears. There was no difference in sex ratio between chickens hatched from eggs stored at 60° and 80°F. (both about 50% pullets). Storage at 40°F. produced 54.6% pullets.

Storage temperature and age of egg did not affect the hatching weight of the chicks,

but when 14 days old, pullets from eggs stored at 80°F. were significantly heavier than pullets from other groups.

Brown, D. L. (1960). **The Nguni breed of cattle. II. Mortality, grazing behaviour, and beef production.**—Emp. J. exp. Agric. 28, 44-52. 3762

Studies on Nguni cattle (Zulu-Swazi improved by selection) were made at an experimental station in Swaziland. Calf mortality during 1946-1950 was about 7% of live births. Major causes, in descending order, were suspected heartwater, "poverty", and sweating sickness, followed by plant poisoning, pneumonia, snake-bite and "red-water". Grazing behaviour studies revealed: a sense of smell, selectivity, absence of relationship between wind direction and grazing direction, gregariousness within groups, and defaecation and urination in watering places, especially when the temp. was over 80°F. Suckling occurred once daily and maternal affection was strong. Water consumption was 3½-5 gal. daily per cow and calf. Of 75 carcasses, 48 were graded as "Prime", 26 as "Grade I" and one as "Super".

—T.E.G.R.

TECHNIQUE AND APPARATUS

Kolesov, S. G. (1959). [**Anabiosis of pathogenic micro-organisms.**] pp. 142. Moscow: Gosud. izdatel'stvo sel'skokhoz. literatury. 1r. 90k. [In Russian.] 3763

Professor Kolesov is engaged in research on vaccines at the State Control Institute for Veterinary Preparations in Moscow. In this monograph he discusses the resistance of bacteria, viruses and invertebrates to freezing and to drying, with references to the literature.

—R.M.

Mellen, W. J. & Wentworth, B. C. (1960).

Comparison of methods for estimating thyroid secretion rate in chickens.—Poult. Sci. 39, 679-686. [Authors' summary modified.] 3764

A form of radiiodine assay in fowls which allows estimation of individual thyroxine secretion rates was used. It is based on measuring effects of increasing thyroxine doses. Mean secretion rates were between 3.5 and 4.0 µg.L-thyroxine/100 g. per day. Relatively low variability within groups indicates that this method should be a sensitive one for comparing thyroxine secretion rates among experimental groups of fowls.

REPORTS

Great Britain. (1960). **Ministry of Agriculture & Fisheries. Report on Animal Health Services for the year 1958**, pp. 119. London: H. M. Stat. Off. 6s. 0d. 3765

On the whole the year was a good one as regards notifiable disease. There were 116 outbreaks of FOOT AND MOUTH DISEASE as against 184 in 1957. All were in England and Wales and of the 29 primary outbreaks 17 were thought to have been introduced from the Continent and 10 by meat imported from South America.

ANTHRAX also declined but there was a further sharp rise in SWINE FEVER. Outbreaks of NEWCASTLE DISEASE were lower, 759 in all against 1,034 in 1957, but 1,290,884 birds were slaughtered.

The eradication of BOVINE TUBERCULOSIS took a great step forwards and by the end of 1958 only about 15% of the cattle in Gt. Britain were not in attested herds, or in attested areas. In attested and eradication areas all cattle which react to the test are slaughtered against payment of compensation. The number of animals slaughtered under the Tuberculosis Order in 1958 was the lowest ever and fell to 350 cases.

Over 12,500 horses, donkeys and mules have travelled by sea during the year with a casualty rate of less than one in a thousand. Perhaps the most noticeable feature of the export trade was the banning the importation of all ruminants and swine by the Australian Government on account of the risk of introducing BLUETONGUE disease which had appeared in Spain and Portugal.

The calf vaccination scheme against CONTAGIOUS ABORTION was about the same as in 1957. The total issue of vaccine from the Ministry's Laboratory reached 668,000 doses for the official scheme as well as to practising veterinary surgeons.

Part V of the report and the largest is given over to the work of the Ministry's Laboratory at Weybridge, the Veterinary Laboratory at Lasswade near Edinburgh, the Veterinary Investigation Service and the Artificial Insemination centres at Reading and Ruthin. Studies on JOHNE'S DISEASE and the practical value of the complement-fixation test have continued. Approximately 500 samples were examined for TUBERCULOSIS mainly in connexion with the attested herds scheme and the Tuberculosis Order. Twenty new cases of TUBERCULOID MASTITIS caused by acid-fast

bacilli which grow more rapidly than tubercle bacilli on culture were diagnosed. Five other strains of (saprophytic) acid-fast bacteria were isolated from reactor cattle in attested herds.

The Laboratory investigated many other diseases including parasitic infections.

The report contains 34 statistical tables.

—D. S. RABAGLIATI.

Union of South Africa. (1960). **Johannesburg. Annual report of Director, Abattoir and Live-stock Department for the period 1st July, 1958, to 30th June, 1959**. [Robinson, M. C.] pp. 13. Johannesburg: Radford Adlington Ltd. 3766

The report is largely statistical. 1,378,752 animals were slaughtered in the abattoir. This included 4,107 horses and 10,454 donkeys. The total diseased meat condemned was approximately 1,461 tons.

Cattle supplies were well maintained during the year, although they showed a decrease of 13,000 compared with the previous year, but the calf slaughterings were the highest ever recorded.

Of the preventive inoculations carried out 4,480 were for ANTHRAX, 268 against CONTAGIOUS ABORTION and 1,518 for FOWL TYPHOID.

In the dairy herd inspections 79,692 cattle were examined. Of the common conditions met with, MANGE, MASTITIS, TICK INFESTATION, CALF PARATYPHOID, ANAPLASMOSIS, BABESIOSIS, BLACKLEG and THREE-DAY SICKNESS were noted.

Out of 1,846 milk samples examined by the biological test, only seven (0.3%) were positive for TUBERCULOSIS compared with 0.6% in 1955. There are five statistical tables.—D. S. RABAGLIATI.

Northern Rhodesia. (1960). **Department of Veterinary and Tsetse Control Services. Annual report for the year 1959**. [Swan, J. F. C.] pp. 21. Lusaka: Government Printer. 3767

As the result of rearrangement of Ministerial responsibilities, the department has now taken over from the game department both the responsibilities and the staff of the tsetse fly control division. On the other hand, the responsibility for African animal husbandry has been transferred to the Ministry of African Agriculture.

Climatically the year was unsatisfactory for livestock but nevertheless speaking generally the health of the livestock was good.

The tsetse fly picture was one of activity and growing encroachment. In general the initiative has been held and by selective bush clearing, game exclusion, insecticidal "fogging" and spraying and planned settlement, the advance has been halted and turned back. There is, however, no Province which has not got its own fly problems. Owing to the shortage of staff and other difficulties no planned TRYPANOSOMIASIS research could be undertaken.

As the authorized veterinary establishment has been completed, graduates of the veterinary school which is very popular are now only taken on as vacancies occur. Formerly graduates were appointed as soon as they became available from the school.

The number of dogs vaccinated against RABIES was greater by 8,000 than in the previous year, and the total number of confirmed cases fell. One confirmed case of furious rabies was notable in that the affected dog survived for no less than 16 days after the onset of clinical symptoms.

Part IV of the report deals with the TSETSE FLY control and the work carried out in each of the numerous provinces is described separately. There were 110 cases of human TRYPANOSOMIASIS during the year.

The report includes nine tabulated appendices describing the work of the service.

—D. S. RABAGLIATI.

Tanganyika. (1960). **Annual report, 1959, Veterinary Research Laboratory, Mpwapwa.** pp. 27. Mpwapwa: The Laboratory. 3768

The tempo of the work was disrupted by two FOOT AND MOUTH DISEASE experiments on SAT II vaccines carried out with the Animal Virus Research Institute, Pirbright and the veterinary department of Kenya.

Large drug trials were carried out at Kingolwira for TRYPANOSOMIASIS but were not completed. It was found that disintegration of the trypanosomes takes place in the bovine body immediately after death.

A section of HELMINTHOLOGY was started and much routine diagnostic work was carried out. It appears that *Haemonchus contortus*, *Trichostrongylus colubriformis* and *Oesophagostomum columbianum* are probably the most important gastro-intestinal species in sheep and goats while in calves *Cooperia pectinata* and *C. punctata* with *H. contortus*

and *Oes. radiatum* are the species of importance.

Work was also carried out on RIFT VALLEY FEVER and on INFERTILITY in cattle, including *Vibrio fetus* infection, TRICHOMONIASIS and BRUCELLOSIS. The Chemical department was also active.

Routine diagnosis was carried out on 2,105 specimens compared with 905 last year. A good proportion of specimens submitted as "clinically resembling tuberculosis" proved to be *Corynebacterium pseudotuberculosis*.

Clinical work was performed as usual at the veterinary research farm. At the routine tuberculin test at the farm, two reactors occurred and were slaughtered.

A preliminary host check list of helminth parasites of some domestic and wild animals and poultry in Tanganyika is given.

—D. S. RABAGLIATI.

Tanganyika. (1959). **Annual report of the Department of Veterinary Services for the year 1958.** [Roe, J. E. R.] pp. 61. Dar es Salaam: Govt. Printer. Shs. 5/-. 3769

The activities of the department have been handicapped by a shortage of staff, both professional and lay.

RINDERPEST did not occur in cattle but was a problem because of its prevalence in game animals. Progress has been made by mapping out the EAST COAST FEVER area of the Territory.

The demand for vaccines for the ordinary diseases has grown appreciably and many African authorities have shown greatly increased interest in using the free vaccines provided. The financial provision in these cases is derived from the cattle tax.

Although the spread of RABIES has not been checked, because it is now well established in wild carnivora, some success has been achieved in certain areas of the Southern Highlands Province.

In the Lake Province at least 100 animals died from ANTHRAX before the outbreak was controlled. In the same Province BLACKLEG is sporadic but in the East Lake districts it is widespread and over 1,700 deaths were confirmed.

FOOT AND MOUTH DISEASE is also widespread. Hitherto it has not been taken seriously as its effects are negligible but the requirements of neighbouring countries have caused it to assume a greater importance.

The Territory is still looked upon as the parasitologist's dream and the damage done by parasites is considerable.

JOHNE'S DISEASE occurred in two cows which were slaughtered and the laboratory confirmed diagnosis.

Measures to stamp out RABIES in North Mara district of the Lake Province were continued from February to April. All puppies over three months were destroyed or vaccinated. The quarantine restrictions for this district were removed in November.

TUBERCULOSIS is widespread throughout the Southern Highlands Province but the disease seldom becomes acute. It is generally confined to the retro-pharyngeal and mediastinal lymph nodes. Cases of "SKIN TUBERCULOSIS" have been detected in the Lake Province.

TICK-BORNE DISEASES are prevalent. The prolonged dry weather in the Northern Province caused many owners to drive their animals into the TSETSE FLY infested bush. The use of antrycide prosalt and ethidium bromide proved very effective.

—D. S. RABAGLIATI.

Sarawak. (1959). **Annual Report of the Department of Agriculture for the year 1958.** [Cook, J.] pp. 68. Kuching: F. W. Goodwin, Govt. Printer. [Veterinary Services pp. 44-45.] 3770

Vaccination against HAEMORRHAGIC SEPTICAEMIA in cattle, PASTEURELLOSIS in pigs, NEWCASTLE DISEASE and FOWL POX in poultry was free. Five outbreaks of PASTEURELLOSIS in pigs were reported and 596 pigs were successfully vaccinated in four of them.

BABESIOSIS was reported in cattle and sheep and MELIOIDOSIS was confirmed in a group of imported goats.

The veterinary clinic continued to do good work. Meat inspection is carried out by the Municipal Health Department and the veterinary branch co-operates when required.

—D. S. RABAGLIATI.

van Vloten, J. G. C. (1960). Gezondheidsdienst van postduiven. Jaarverslag 1 november 1958 t.m. 31 oktober 1959. [Annual report of the health service for homer pigeons 1958/59.]—Tijdschr. Diergeneesk. 85, 623-628. [In Dutch.] 3771

Over 3,000 pigeons were treated under the health service scheme and nearly half were found to be infected with *Trichomonas hepatica*. Agglutination tests for paratyphoid were positive in 358 of 1,102 sick birds. Another 1,129 blood samples examined by the c.f. test for psittacosis yielded 532 positive

results. Sixty cases of pigeon pox were dealt with. Coccidial oocysts were present in excreta from 656 birds; another 132 were infested with *Ascaridia columbae* and 168 with *Capillaria columbae*. Many other varied conditions are mentioned in the report, including the results of 478 P.M. examinations.

—R.M.

Belgian Congo. (1960). Rapport annuel 1959 du service vétérinaire du Congo Belge.

[Veterinary services in the Belgian Congo.

Annual report for 1959.] pp. 8. Léopoldville:

Director of Veterinary Services. 3772

At the end of 1958 there were 56 State veterinary surgeons and 52 others, compared with 49 and 59 respectively in the previous year.

A short summary is given of the disease position in each of the four Provinces of the Belgian Congo and also a report on the three veterinary laboratories. There are three veterinary schools giving different standards of teaching and diplomas.

In the Province of Léopoldville, RABIES is enzootic and can only be kept down by vigorous measures. The Flury vaccine is used and 1,516 dogs and 159 cats were vaccinated. Two cases occurred in Kivu Province among 5,590 Flury-vaccinated dogs. In Katanga the incidence is regressing: Flury vaccine was used on 1,870 dogs. Rabies is widespread through Kasai, and a higher incidence is suspected than would appear from the number of cases confirmed (49 dogs, 5 cattle); 2,387 dogs were given Flury vaccine, but shortage of staff was a problem although the medical service assisted in numerous posts.

STREPTOTHRICHOSIS appeared in a severe form in some herds and slaughter was the only means of getting rid of it from some centres.

In the Eastern Province BOVINE STREPTOTHRICHOSIS tended to spread and the course was generally severe.

In Katanga TUBERCULOSIS increased to some extent, and at the end of 1958 LUMPY SKIN DISEASE was diagnosed.

In the Province of Kasai STREPTOTHRICHOSIS tended to become enzootic but did not cause severe disease even in calves with extensive lesions.

The veterinary laboratories at Elizabethville and Stanleyville continued their activities in the manufacture of vaccines but the laboratory at Léopoldville was only just beginning to function.—D. S. RABAGLIATI.

BOOK REVIEWS

Ziegler, H. & Mosimann, W. (1960). *Anatomie und Physiologie der Rindermilchdrüse. [Anatomy and physiology of the cow's udder.]* pp. 144. Berlin (& Hamburg): Paul Parey. DM 21.60. 3773

The first half of this book deals with the anatomy of the udder and contains sections on the gross anatomy of the glandular and supporting tissues; the vascular and nerve supplies; the microscopical structure and architecture of the alveoli, ducts and cisterns; the histological changes occurring during regression; and on the embryonic and post-natal growth of the mammary gland. The second half is concerned with mammary physiology and in it are discussed milk secretion; milk removal; the factors affecting milk production; and the endocrine factors controlling mammary growth and function. The anatomical descriptions contain much recent information on the detailed structure of the udder parenchyma obtained in the authors' laboratories in Bern which has not previously appeared in book form. There are nine extensive lists of references for the various sections of the book.

Omissions of relevant material appear to be few. In the pages dealing with secretion proper no mention occurs of the recent important electron-microscope studies by Bargmann & Knoop and by Hollmann. Although these studies were made on the mammary tissue of small rodents they would have been relevant to the discussion; it may be, however, that they appeared too late for inclusion in the book. Also in discussing the physiology of milk removal no reference is made to the extensive researches of Baryshnikov and Zaks and their colleagues at the Pavlov Institute, Leningrad, on the physiology of the milk discharge process that occurs between milkings.

These, however, are minor criticisms of an excellent book which will be of great use to all interested in the structure and function of the udder of the cow. It is to be hoped that an edition of this book in English will be prepared so that it may become more widely known.—A. T. COWIE.

Shuttleworth, A. C. & Smythe, R. H. (1960). *Clinical veterinary surgery. Vol. 2. Operative procedure.* pp. viii+398. London: Crosby Lockwood & Son Ltd. 42s. 3774

There are thirteen chapters. The first

four deal with restraint, surgical equipment, surgical procedure, and anaesthesia; seven with the surgery of the anatomical regions, and one each with hernia and fractures. The authors have compromised by presenting their matter on a partly regional and partly systematic basis. This arrangement causes them to include thoracic interferences under surgery of the alimentary tract, and surgery of the tail in the chapter on fractures. Scrotal hernia is dealt with in the chapter on the male generative organs as well as in the special chapter on hernia. This rather haphazard planning gives an unfortunate start to the book.

The chapter on restraint contains some very useful practical advice but "bull-dogs" and bull-rings are dealt with in the chapter on surgical equipment; as are also techniques for intravenous injection. Descriptions of operating-theatre equipment, surgical dress and methods of sterilisation, which one might expect to see under equipment, appear in the chapter on surgical procedure. Reference to the use of succinylcholine as a casting agent is made, not in the chapter on restraint, but under anaesthesia. Methods of anaesthesia are described in too general a way and the absence of details and illustrations of the techniques detracts from the value of this chapter; nevertheless the authors impart much practical information on the several anaesthetic agents. They give no information on anaesthesia for thoracic surgery but refer readers to two journal articles.

In the chapter on the head and neck, the section on equine dentistry is obviously based on much practical experience of this difficult branch of surgery. Similarly there is informative writing on laryngeal ventriculectomy, poll-evil and fistulous withers. There is a complete description of flank laparotomy for the equine abdominal cryptorchid. Throughout the book most useful tips occur as, for example, in performing abdominal cryptorchidectomy, "Having entered the abdomen, the whole hand is inserted *and with the palmar surface turned to the peritoneum to escape interference by the loops of intestines*, the necessary search of the cavity is carried out". The authors have made a praiseworthy attempt to cover all the important conditions of the alimentary canal of the several domestic animals. The reviewer has not seen so many data in a corresponding chapter of any other

surgical textbook. Many of the illustrations are of little value but diagrams such as Fig. 117 show in a simple way the essence of a particular technique. The description of the inguinal approach to the abdominal cryptorchid is full of wise counsel. The use of deep catgut sutures for the repair of the wound in Castick's operation is unnecessary and inadvisable. The technique of repairing the ruptured perineum of a mare or cow calls for clear diagrams but the authors have not even provided a verbal description of this procedure. The reviewer liked the chapter on hernia and, particularly, the section on Strangulated Scrotal Hernia of the Stallion. The layout of p.342 is very misleading for interpolated into the description of median neurectomy is an illustration of the site of plantar neurectomy. Chapters twelve and thirteen provide a fair coverage of veterinary orthopaedics.

This book will be an excellent refresher course for practising veterinary surgeons of some years' standing. It is essentially a practical work and will inspire confidence. Veterinary teachers will not enthusiastically recommend the work to students. One gains the impression that it has been hurriedly produced; its arrangement is rather haphazard, its descriptions too cursory, its diagrams too indefinite and its references to the literature too irregular. The book provoked in the reviewer a sense of disappointment rather than censure for it falls below the best of which both authors are capable.

—G. H. ARTHUR.

Christoph, H.-J. (1960). *Abriss der Klinik der Hundekrankheiten*. [*Diseases of dogs.*] pp. xv + 456. Jena: Gustav Fischer. DM 45.90. 3775

This book is not intended as a textbook but as a guide for students and practitioners. The subject matter has been divided into two main parts, the first dealing with general matters such as techniques of examination, determination of age, restraint, chemotherapy of bacterial infections, anaesthesia and euthanasia. Part two contains chapters on various diseases, arranged by organ systems, including also chapters on plastic surgery such as corrective tail docking and ear cropping, and on deficiency diseases and poisoning. Among the infectious diseases discussed are distemper and hard pad disease, rabies, Aujeszky's disease, virus hepatitis, tuberculosis, streptothrichosis, infections with

bacteria of the paratyphoid-enteritis group, anthrax, tetanus, botulism, leptospirosis and toxoplasmosis. There are 425 illustrations, mostly from photographs, some of which are in colour. Although most of these illustrations are excellent and instructive, one wonders about the value of such pictures as that of a dog lying on the ground, which might have just been run over by a car or is perhaps just asleep, with the caption: "Rabies. Total paralysis", or another, showing a dog scratching itself; caption: "Aujeszky's disease". There is a subject index and paper, print and general appearance of the book are very good. —E.G.

Messow, C. (1960). *Regeneration und Entzündung vom Standpunkt der vergleichenden Pathologie*. [*Regeneration and inflammation from the point of view of comparative pathology.*] pp. 253. Hanover: M. & H. Schaper. 3776

This monograph was written as an habilitation thesis for appointment to a teaching post in the Institute for Pathology at Hanover Veterinary College. It is a general discussion (with references) of the whole subject together with results of the author's own work on the inflammatory reaction after intraperitoneal injection of talc suspension into pigs, sheep, dogs and lab. animals.—R.M.

Withrow, R. B. [Edited by.] (1959). *Photoperiodism and related phenomena in plants and animals. Proceedings of the Conference on Photoperiodism, October 29-November 2, 1957, sponsored by the Committee on Photobiology of the National Academy of Sciences—National Research Council and supported by the National Science Foundation*. pp. xvii + 903. Washington, D.C.: American Association for the Advancement of Science. [Publication No. 55.] London: Bailey Bros. & Swinfen Ltd. 133s. 3777

This book is the proceedings of a symposium held at Gatlinburg, Tennessee in 1957. Contributions from 75 authors are included and each gives a bibliography; the result is a very valuable work.

As to what is meant by the term photoperiodism, the words of Withrow on p.439 are useful:—"Ecologically one might define photoperiodism as a mechanism evolved by both plants and animals for measuring seasonal time it is necessary for Temperate Zone organisms to be able to predict the onset of unfavourable periods far enough ahead so as to get the year's growth and reproductive

phases over with before the onset of cold or hot weather or drought." This book deals with the influence of varying periods of light on phenomena such as germination of seeds, cyclical development and regression of the reproductive organs and migration with its related phenomenon of deposition of body fat. The question of endogenous "clocks" is considered and also the relationships between cell mitosis and diurnal rhythm. In some species spawning is influenced by the phases of the moon.

Light variation may not be the sole factor in inducing periodism; in the tropics, where length of daylight varies less than in temperate zones, other factors may operate. In mammals which hibernate, developmental changes in the reproductive organs are progressing during hibernation and temperature may be of primary importance here. Thus the various ecological relationships must be studied for each species individually. The physiological

participation of gonadotropins, gibberellins and gibberellin-like substances in periodic changes are dealt with.

The fact that the domestic fowl originated from an essentially tropical species and the possibility that highly productive breeds, as evolved under selection by man, have minimal light requirements for egg production are interesting when considering the influence of artificial lighting on egg production.

—A. BROWNLEE.

Anon. (1959). **List of veterinary films and films of veterinary interest.** pp. 227. Utrecht: World Veterinary Association. Permanent Committee. 3778

This list, which has been reviewed [*V.B.* 30, 936], may be obtained from The Secretariat of The World Veterinary Association at Biltstraat 168, Utrecht, Netherlands by prepaying the equivalent of 5 Dutch guilders.

BOOKS RECEIVED

[Notice of recently received books in this list does not preclude review]

Bradley, O. C. (revised by Grahame, T.) (1960). **The structure of the fowl.** pp. xii+143. Edinburgh (& London): Oliver & Boyd. 4th Edit. 25s.

Comar, C. L. & Bronner, F. (Edited by.) (1960). **Mineral metabolism: an advanced treatise. Vol. I. Principles, processes, and systems. Part A.** pp. xv+386. New York (& London): Academic Press. \$12.00.

Cruickshank, R. (Edited by.) (1960). **Mackie & McCartney's handbook of bacteriology. A guide to the laboratory diagnosis and control of infection.** pp. xi+980. Edinburgh (& London): E. & S. Livingstone Ltd. 10th Edit. 40s.

Fraser, A. (1960). **Animal husbandry heresies.** pp. 200. London: Crosby Lockwood & Son, Ltd. 16s.

Smythe, R. H. (1960). **The female of the species.** pp. 142. London: Country Life Ltd. 21s.

Westhues, M. & Fritsch, R. (1960). **Die Narkose der Tiere. Band I. Lokalanästhesie. [Narcosis of animals. Volume I. Local anaesthesia.]** pp. 192. Berlin (& Hamburg): Paul Parey. DM 25.80.

Wooldridge, W. R. (1960). **Farm animals in health and disease.** pp. xvi+533. London: Crosby Lockwood & Son, Ltd. 2nd Edit. 35s.



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Further particulars and information as to the method of application may be obtained from the Secretary, Association of Universities of the British Commonwealth, 36 Gordon Square, London, W.C.1.

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The salary for a Lecturer is within the range £A1,730 × £105–£2,435 per annum, plus cost of living adjustments and will be subject to deductions under the State Superannuation Act. The commencing salary will be fixed according to the qualifications and experience of the successful applicant.

Under the Staff Members' Housing Scheme in cases approved by the University and its Bankers, married men may be assisted by loans to purchase a house.

Further particulars and information as to the method of application may be obtained from the Secretary, Association of Universities of the British Commonwealth, 36 Gordon Square, London, W.C.1.

Applications close, in Australia and London, on **31st December, 1960.**

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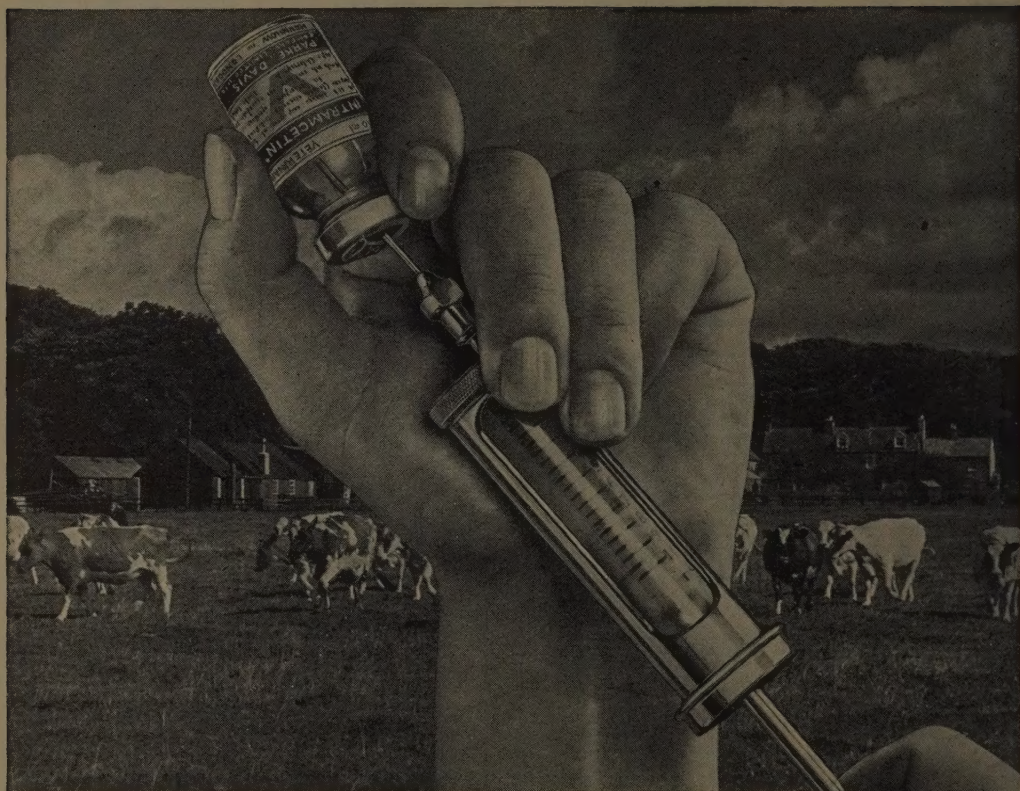
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Zhabin, V. I., 3796.

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